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JUNE 1959

THE MAGAZINE OF TASTE AND SCENT



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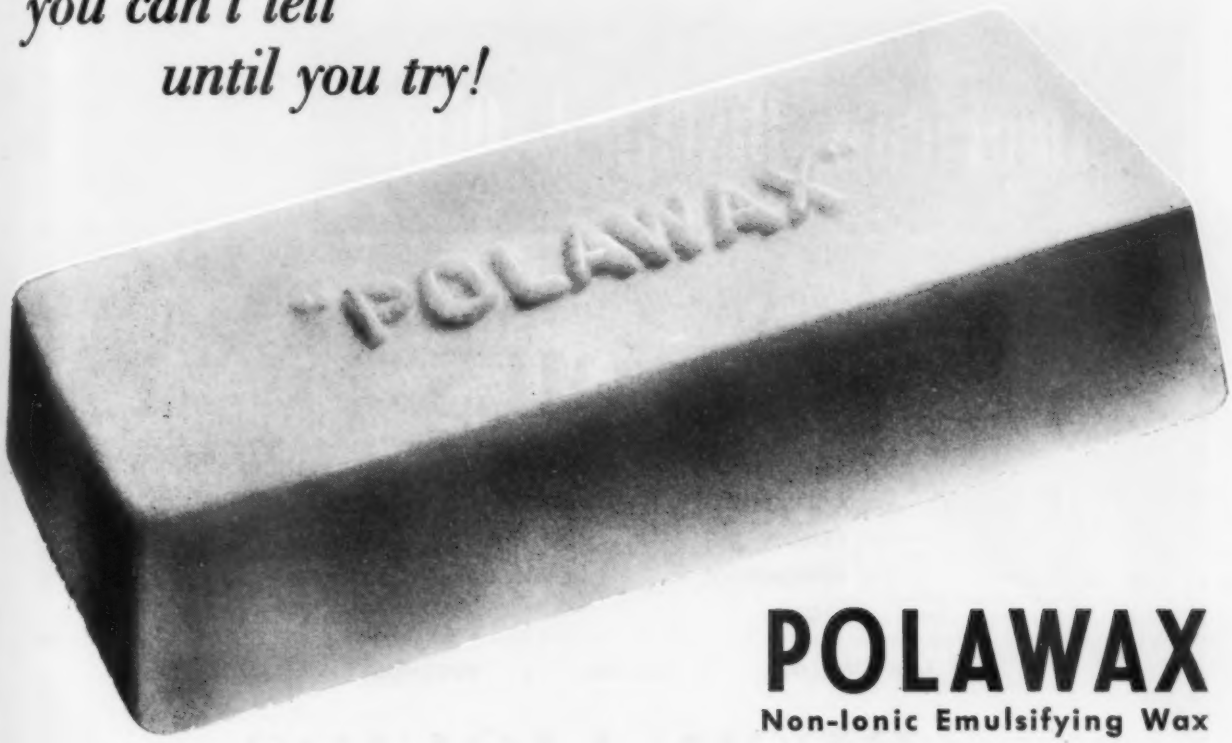
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VOL. 73, NO. 6 JUNE 1959

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LIFE's Philosophy

Recently the Associated Business Publications of which this publication is a member, held a Merchandising Papers Awards Luncheon at which a special award was given to LIFE Magazine.
Mr. Andrew Heiskell, publisher of LIFE, in his speech of acceptance on behalf of LIFE made the following remarks.
"At the risk of taking what southerners call to much 'assumacy,' I might observe that at LIFE we have some workable knowledge of communications—of how to get home with a message. And we congratulate you on the sweeping and dynamic changes you have brought to your editorial pages.

There was a time when most trade journals occupied position number 31 on my weekly reading list. No more. The content of the writing, the vitality of layout and typography; in short, the improvements in the product not only impress me, they have made business papers "must" reading. Nowhere else can I depend on getting early news of trends and market changes. It's time well spent by everybody at LIFE with direct interest in moving goods.

From its very beginning, LIFE magazine set out to build a strong franchise with the trade—all elements of the trade. And business papers have traditionally played a key role in our efforts to win and hold that franchise.

How well businesspapers have contributed toward that end is manifest by the fact that LIFE now enjoys a position with the retail and wholesale marketer which—by every measure we've been able to make—is unique in the field.
Our use of businesspapers is based on a philosophy which can never be suspect as a piece of errant philanthropy. We use businesspapers because they reach the people we want to reach—in an atmosphere of focused interest—at a price which is reasonable."

I am frankly impressed with Mr. Heiskell's understanding of the role of the modern business paper for his remarks certainly ring a bell with all ABP publications.

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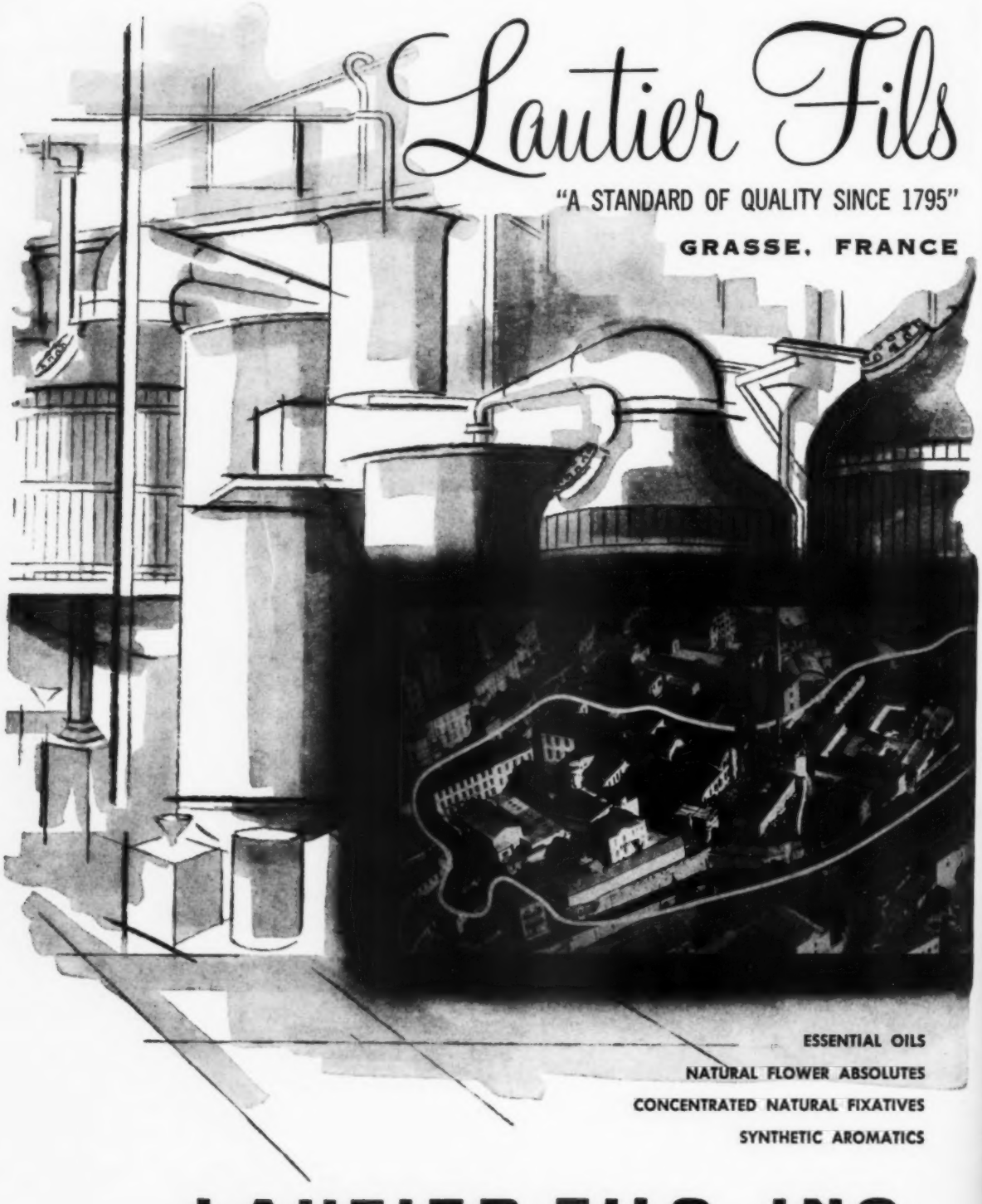
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LAST MINUTE NEWS . . .

Management Foundation Names Top Companies

The names of two cosmetic and toilet-goods companies which it has certified to be "Excellently Managed" in their respective industry for the year 1958, have been announced by the American Institute of Management, a not-for-profit research and educational foundation devoted to the advancement of management. The citations, based on the Institute's continuing analysis of corporations in the United States, Canada, and Europe, were given to American Home Products Corp. and Bristol-Myers Co. They are designed to "bring deserved recognition to those companies whose managements are doing most to increase productivity, with accompanying benefits to employees, shareholders, their plant communities and to the economy as a whole."

Lipstick Unit And Open Display Featured

Fifty-one percent of the merchandise usually displayed and sold in cosmetic departments requires open display. In spite of this fact, standard cosmetic showcases provide only about sixteen percent of the display area on the tops where open displays can be set up. These observations were made by Henry Henley, McKesson's vice president in charge of drug merchandising, while introducing McKesson's new Cosmetic Center, a fixture designed to provide balanced displays in the cosmetic department. The Cosmetic Center is being introduced after thorough tests. It has been installed in 56 test stores in five cities. Reports show cosmetic department sales increases of from twenty percent to fifty percent in test stores.

1959 U.S. World Trade Fair Sets New Records In Third Year

Buying, tourism and investment activity will exceed last year's record-breaking performance at the Third Annual U.S. World Trade Fair, according to Charles Snitow, president of the exposition, at the conclusion of the international show's 12-day run from May 8 through May 19 at the New York Coliseum. Official figures reveal that trade attendance this year exceeded 1958 by 12% with a total of 162,000 trade buyers, merchandise executives, manufacturers' representatives and others from all over the world. Public attendance during the 6 days alloted for general admission exceeded 389,000, a 10% rise over the previous year. In addition to exceeding its own total attendance mark of last year, with over 551,000 trade and public visitors, it is estimated that the 1959 U.S. World Trade Fair has set a new attendance record for the New York Coliseum. The Fair's 3,000 exhibitors from 63 nations were almost unanimous in acclaiming the '59 show as, "a complete success."

Soap Mfg. To Redeem Labels With U.S. Savings Stamps

A private corporation June 11 announced—and the Treasury indorsed—a national campaign to give United States savings stamps to buyers of certain brand name soap products and hair tonics.

The tie-in was announced at a news conference by the OBA Corp., an offshoot of the B. T. Babbitt Corp. of New York, maker of cleansing products and hair preparations.

Marshall S. Lachner, president of Babbitt, said he hopes the promotion will boost sales of his firm's products. He made a big splash in merchandising last year by offering coupons good for free transit rides in seven cities including New York.

OBA, which stands for "Own a Bit of America," said that when the campaign gets under way in September, it is likely that only Babbitt products will bear labels which can be redeemed for savings stamps.

However, Mr. Lachner said three other manufacturers are thinking about participating. He said he hopes others will join—even competing soap makers.

James F. Styles, director of the Treasury's saving bond program, said the department is delighted when private industry "promotes a product of the government."

Philadelphia College Alumni

At the Spring Reunion Dinner of the Alumni Association of the Philadelphia College of Pharmacy at the Benjamin Franklin Hotel in Philadelphia, May 23, Dr. Paul S. Pittenger received the Annual Alumni Award and 34 members of the class of 1909 received citations upon the observance of the 50th anniversary of their graduation. Dr. Pittenger, who retired recently from the post of vice-president of the Sharp and Dohme Division of Merck and Company, graduated from the College in 1909 and was recognized by the Alumni Association because of his outstanding accomplishments in pharmaceutical education, research and industry for over half a century.

New Process For Fatty Acids

A new process for the manufacture of fatty acids useful in industry has been developed at the Shri Ram Institute for Industrial Research, Delhi, according to a spokesman for the Institute. Batches of six to eight pounds of fatty acids have been processed and sufficient data collected to bring the unit to commercial size. The product compares favorably with dimerized fatty acids presently being imported. Conditions for preparing alkyds and polyesters using the finished fatty acids have been standardized and work on preparation of polyamides and similar products is in progress.

CED Urges Reduction Of Trade Barriers

The European Common Market is a major step toward political unity and economic growth in Europe which can strengthen the entire free world, said the Research and Policy Committee of the Committee for Economic Development (CED) in a statement released in Washington this month. To help integrate the Common Market into the world economy and to avoid possible discriminatory effects upon other nations, the Committee statement urged that the U.S. should take the lead in a worldwide movement for the general reduction of barriers to trade. It said the situation required a "basic change" in U.S. commercial policies.

Belgian Congo Expands Palm Oil Exports

The Belgian Congo, one of the leading exporters of palm products, is gearing production to meet a widening demand from Europe and the United States, according to the *New York Journal of Commerce*. Exports from the Congo in 20 years have increased 150 per cent. This has been the largest per cent increase in exports among the palm oil producing areas in the world. The Belgian Congo now ranks second to Nigeria in the production of palm oil. Exports are showing a rapid growth and in some trade circles it is predicted that future exports will equal those of Nigeria.

Smith Kline & French Film Shown At Venice

"A New Chapter," a unique film designed especially for viewing by psychiatric patients during rehabilitation, conceived and sponsored by Smith Kline & French Laboratories has been selected as a United States entry to the Venice Film Festival in July. It is one of 20 "non-Hollywood" type films chosen by the Committee on International Non-Theatrical Events, a voluntary group formed last year for the purpose of coordinating U.S. entries in overseas film festivals. "A New Chapter" will be submitted to the Venice Film Festival in the science and didactic category.

Industry People

Jack H. Mohr has been elected president and a director of Tintex Co., Inc. and a director of Park and Tilford. . . . *Gilbert M. Leigh* is manager of the newly-created Pioneering Research Area of Colgate-Palmolive Company's Corporate Research Department. . . . *Samuel Cooke*, founder and president of Penn Fruit Company, elected a director of Crown Cork & Seal. . . . *John Kennedy* appointed sales supervisor for consumer products of the fine chemicals division of Shulton, Inc. . . . *Herbert P. Nack* is general manager of the new Drug Division of Colgate-Palmolive Company. . . . *Dr. Karl Keller* and *Albin Wilko* have joined the technical staff of Fries and Fries.



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FDA's New District

This is being written the day after the dedication of FDA's first new district in almost twenty-five years, right here in Detroit. The affair was well attended with a host of luminaries starting with Secretary Arthur Fleming, Commissioner George Larrick, Detroit Mayor Louis Miriani and Dr. C. A. Morrell. The building was named after Commissioner Larrick. The plaque carrying his name was donated by the Planning Committee.

Prior to dedication, visitors were given a guided tour of the very modern laboratories during which time inspectors and chemists gave demonstrations of their activities supplemented by pictures of some of the more unusual violations encountered. This writer had his health analyzed and ailments cured by a complicated light machine seized as a fraudulent device.

Inspector John Hanagan was our tour guide. The following gave demonstrations: T. E. Byers, N. V. Fehringer, J. C. Griffin, R. T. Jira, H. E. Pilson, G. L. Reed, M. J. Ryan, E. Sarnoff and S. Stringer.

Following the dedication, a cocktail party was held at the Book Casino and a banquet at the Sheraton Cadillac Hotel. The speaker of the evening was the Hon. G. Mennen Williams, Governor of the State of Michigan.

This is one of two of the best equipped Districts according to the speakers at the dedication. Veteran FDA-er George T. Daughters is chief of the District. His chief chemist is H. M. Bollinger and the chief inspector is T. C. Maraviglia.

Ted Coneybear, president of the Society of Cosmetic Chemists and I represented the Society. We both felt that here was very tangible proof of how the consumer was protected by professional civil servants. We were both proud to be invited.

Cosmetic Science

Under this title, the Society of Cosmetic Chemists of Great Britain held a congress in London on April 15th for two days. All the papers were preprinted. Each participant received a set well in advance of the congress. Speakers were given seven minutes to summarize their papers only, the balance of the forty-five minutes assigned to each paper was taken up by prepared discussions and "from the floor" questions and comments. And the discussions were many and lively.

Delegates to the congress came from a dozen countries including Dr. Herb Heinrich, Sab Strianse, Bob Kramer and myself from the U. S.

Dr. Bullough's paper played a little rough with the cosmetic industry. Worse yet, he was on BBC TV the night before with the same line. Wish I hadn't been a Yankee guest so I could have spoken my mind. There is no need for this kind of public display of superiority of one discipline coupled to the degrading of an industry.

President "Bobbie" Marriott and Chairman Dr. "Middy" Middleton are to be congratulated.

Lipstick Colors

In spite of the fact that FDA has found various forms of harm (enlarged spleens, anemia, kidney and liver damage, etc.) resulting from the feeding of seven Certified colors used in lipstick at different dosage levels, and thereby threatens to delist them along with ten untested but related colors, one cannot help but feel that the cosmetic industry was dealt a "low blow."

The press release carried the disclaimer that no harm had been reported by lipstick users who had been exposed to these colorants. However, the several newspaper clippings seen did not mention it.

All this took place while the writer was in London attending the Society of Cosmetic Chemists of Great Britain Congress of Cosmetic Science. One newspaper reporter there asked me if the "harm" resulting from testing these colors meant cancer. This gives you an idea of how the press there interpreted this word. (Indeed, a number of women in the U. S. have asked me a similar question.) The same reporter also asked why had these colors been permitted all these years if they were harmful.

As a result, FDA has created a certain amount of needless hysteria among women lipstick users.

Continued on page 17

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Continued from page 15

We all know why FDA is trying to get new color legislation. And in general the industry goes along with it. But is it right to use a maneuver that unnecessarily puts the cosmetic industry in a bad light so FDA can get the legislation it wants?

Notes

Rattner has recently enjoyed some publicity on the use of sulfur and acetone mixed with solid CO_2 as an acne treatment. . . . Looks like Hueper's comments on Certified colors before the Delaney Committee at long last stirred up quite a hornet's nest at FDA in their threat to remove seventeen colors from use in lipsticks . . . wonder why cigarette smoking is still allowed. . . . It is hoped the new synthetic penicillins being worked up by Bristol in conjunction with Beecham are less sensitizing than the ones already in use. . . . ABRAC claim their aceto-glycerides are different from other similar products on the market, in that they are mixtures. . . . The April 18th issue of THE PHARMACEUTICAL JOURNAL has an interesting editorial on the antifungal properties of griseofulvin. You take it by mouth to affect fungi on the skin. . . . The new 8 cent U. S. postage stamp has a slogan on it reading, "World Peace Through World Trade." Just seems a little paradoxical. . . . There are synthetic perfumes, flavors, fabrics and what now. Add to these synthetič whiskey reported by R. Carroll at the meeting of the ACS division of agricultural and food chemistry. . . . The forest Products Laboratory is investigating glycerin and other polyols made by hydro-genolysis of sugars. A similar product was used as a glycerin replacement in Germany. . . .

Book Review

PIGMENTS, VARNISH, AND LACQUER CONSTITUENTS, a glossary of, by J. H. Martin and W. M. Morgans. Chemical Publishing Co., Inc., N. Y. $3.50.

This glossary consists of two sections. Section one is devoted to pigments. Section two is devoted to the varnish and lacquer industries. It gives detailed descriptions of the raw material, processing steps, and intermediate and finished products that occur in these industries, including the most recent terminology.

For easy reference all items are arranged in alphabetical order and ample references are included.



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QUESTIONS & ANSWERS

1339 HAIR OIL

Q. *I would like to make hair oil like "Wildroot Cream," but our mixture sticks to the side of the bottle and does not slip free from the sides as does Wildroot. Can you tell us how this is done? L. V., New Jersey.*

A. We do not know the composition of Wildroot Cream Oil hairdressing, nor do we know how the producers get the product to drain cleanly down the sides of the bottle. The following hair dressing formula elaborated by the Atlas Powder Company, Wilmington 99, Delaware, will give you a start. You can modify this to suit your needs.

O/W HAIR DRESSING LOTION

		%
	Petrolatum	7.5
	Mineral oil	37.5
A.	Beeswax	2.0
	Atlas G-1425 lanolin derivative	4.5
	Arlacel 83	2.0
B.	Water	46.5
	Preservative	q. s.
C.	Perfume	q. s.

Preparation: Heat (A) to 75°C. Heat (B) to 75°C. Add (B) to (A) slowly with moderate, but thorough agitation. Perfume at 45°C., and agitate until cold.

1340 COLOR SOLUTION

Q. *We find we are unable to prepare an aqueous color solution that will not stain anything it touches both before and after it has been added to our after shave preparation. We are using FD&C Yellow No. 5 as follows: (1) add 35 grams slowly with constant stirring to 126 fluid ounces of deionized water that has been boiled and cooled to 80-85° C., until dissolved completely. Then 5 fluid ounces of SDA 40 are added. After aging and filtering the product, 13.1 fluid ounces of color solution is slowly added with constant stirring. We will appreciate your comments as to just what is being done wrong. We would also like information as to the amount of propylene glycol that should be used as a preservative in a gallon of aqueous color solution.*

A. It is no surprise to us that you get a stain from the amount of color you add to your after shave lotion. This is way too much color. If you are after a certain depth of yellow, why don't you try D&C Brown No. 1. This color, however, is only soluble to the tune of about ½ per cent, so that when you make up your stock solution, do so accordingly. It takes from 14 to 18 per cent of propylene glycol to preserve an aqueous color solution, depending upon the color. You should try 14 per cent and see if that will do the trick for you.

From time to time suggestions have been and will be made in this magazine with respect to processes, devices, materials, appliances, equipment and the like. It is not practicable for the writers and editors to have a patent search or examination made in connection with each such suggestion. Our readers are, therefore, requested and indeed urged to determine for themselves whether any patent or other right will be violated before acting on any such suggestion.

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Danville, Illinois

Study Of The Non-Terpenic Fraction Of Puerto Rican Bay Oil, *Myrcia Acris*



Engineering Building, College of Agriculture and Mechanic Arts, University of Puerto Rico.

DR. NOEMI GARCIA DE MARTINEZ NADAL*

Chemical information as to separation and identification of the different constituents of the non-terpenic fraction of bay oil from Puerto Rico. This work was carried out at the Research Center of the College of Agriculture and Mechanical Arts, Mayaguez, P. R.

The essential oil obtained from bay leaves, *Myrcia acris,* was separated into two main fractions, namely terpenic and non-terpenic, for a detailed study of the isolation and identification of their different constituents using chromatographic methods. The first major fraction, which consisted mainly of terpenes and terpenoid compounds was studied and its different constituents were separated by column chromatography. Results of this work appeared in an earlier edition of this journal (1).

Studies were carried out in the Non-Terpenic fraction of Bay Oil, which consists chiefly of phenolic compounds.

This fraction, which could also be called phenolic, is considered the most important one of bay oil, since generally the oil is evaluated by its phenol content. The terpenic fraction contributes to the aromatic value of the oil, but its medicinal value is due chiefly to the presence of phenols. Normally, bay oil contains about 50-55% phenols.

Experimental Results and Discussion

I— *Isolation of "Non-Terpenic Fraction" of Bay Oil.*

To study the non- terpenic fraction of Puerto Rican Bay oil, separation was effected by various methods

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which included chromatography, reaction of phenols with the alkali hydroxides, fractional distillation at a reduced pressure and separation by the difference in density of the two fractions which pass over in the steam distillation of bay leaves.

Physicochemical properties and phenol content of the different samples obtained for study are shown in table 1.

It can be seen from Table 1 that the highest phenol contents were obtained from fractions obtained by chromatographic separation and by absorption of soluble phenolates with alkali hydroxides.

Table 1 — Physicochemical properties and phenol content of different samples of the "Non-Terpenic" portion of Bay Oil, separated by different methods.

Sample No.	Method of Separation	Physicochemical anaylsis		Phenol Content
		Sp. gr. 15/15°C.	Ref. Index n/25°C.	
1	Steam distillation	1.0371	1.529	85.0
2	KOH absorption (soluble phenolates)	1.0620	1.5240	98.7
3	Fractional distillation	1.029	1.5271	82.0
4	Chromatography	1.0630	1.539	97.5

II— *Study of Non-Terpenic fraction of Bay oil separated by difference in density of the two fractions which pass over in steam distillation of Bay Leaves.*

Separation of the non-terpenic fraction by actual distillation of bay leaves is often done in commercial distilleries. This fraction is used to strengthen the total oil, raising its phenol content, and thus commanding a higher price in the market. We obtained a non-terpenic fraction separated by this method from a commercial distiller in Puerto Rico. Determination of its physical properties as well as of its total phenols was made, which appears in Table 1. To further investigate its components, the whole fraction was chromatographed on alumina using heavy and light petroleum ether as solvent and eluant. Last fractions were collected with acetone. The following tables gives a description of the fractions.

It can be seen from Table 2, that the non-terpenic fraction separated by difference in density of steam distilled fractions, and which according to previous analysis by KOH absorption, indicated the presence of 85% phenols, after purification, by chromatographic adsorption, gave eight fractions of which 3 of them (about 15-18% of the total fraction) were not phenolic in nature. The last five fractions consisted chiefly of phenols. Citral and cineole were not present in these non-terpenic fractions.

The first three fractions separated by the chromatographic separation of the non-terpenic fraction had a pleasant geraniol odor. Parkin and Wells (2) studying the composition of Bay Oil from the Virgin Islands reported a small amount of an unknown alcohol of a pleasant geraniol odor. However, they could not isolate or identify it. We carried out determinations for a primary and secondary alcohols on these fractions with negative results. It seems that this fraction does not consist of alcohols or phenols. A separate study that will lead to the identification of this fraction is planned.

Table 2 — Chromatographic separation of the constituents of the Non-Terpenic fraction of Bay Oil separated by difference in density of steam distilled fractions.

Fraction	Physical Constants		Tests		
	Ref. Index n/25°C.	Density 15/15°C.	Citral	Phenol	Cineole
1	1.4926	.9871	—	—	—
2	1.5055	1.009	—	—	—
3	1.5061	1.078	—	—	—
4	1.5064	1.0172	—	+	—
5	1.5105	1.0198	—	+	—
6	1.5160	1.0200	—	++	—
7	1.5430	1.0692	—	++	—
8	1.5386	1.0627	—	+++	—

III— *Study of Non-Terpenic Fraction separated by absorption with alkali hydroxides.*

A non-Terpenic fraction separated from the total oil by extraction with 5% potassium hydroxide followed by

Table 4 — Description of chromatographic separation of the 5th fraction obtained in the Fractional Distillation of Bay Oil.

Fraction 5	Physical Constants		Tests			Phenols		Main Constituents
	Index of ref. n/25°C.	d/25°C.	Cineole Resorcinol	Citral		FeCL3	Benzoyl Derivative	
				Schiffs'	Semicarbazide			
a	1.4457	.8370	89°C. m.p.	—	—	—	—	Cineole
b	1.4410	.9500	—	++	—	—	—	Citral
c	1.4380	.853	—	++	—	—	—	Citral
d	1.4315	.837	—	++	—	—	—	Citral
e	1.4830	.9500	—	++	168°C. m.p.	—	—	Citral
f	1.5325	1.1800	—	—	—	+++	69°C. m.p.	Eugenol

decomposition of its potassium salt was studied. In this method of extracting phenols, acids and alcohols, and other water and alkali soluble constituents will go into solution thus, increasing the non- terpenic fraction. Once extracted, the alkaline solution was freed of traces of oil by ether washing, and the phenols regenerated by addition of sulphuric acid (1:3) and finally ether extracted. The ether layer was dried with anhydrous sodium sulphate and evaporated.

The oil obtained by this method was passel through a chromatographic column to separate its phenols and to compare with other separations of the oils as to purity. Silicic acid was used as adsorbent and heavy and light petroleum ether were used as solvent and eluant. Hexane, ethyl acetate and acetone were used to collect the last fractions. The following table gives a description of the fractions.

It can be seen from Table 3 that the non-terpenic fraction obtained by extraction with potassium hydroxide and which consisted of 98.7 percent of phenols could be further purified by chromatographic adsorption. A small amount of a substance which is extracted with potassium hydroxide and which could be either an aromatic acid or alcohol is present in this fraction and is separated by chromatographic absorption. Like in other non- terpenic fractions, this small fraction had an agreeable genaniol aroma.

Table 3 — Chromatographic separation of the constituents of the Non-Terpenic fraction of Bay Oil separated by KOH extraction.

Fraction	Physical Constants		Tests		
	Ref. Index n/25°C.	Density 15/15°C.	Citral	Phenols	Cineole
1	1.5440	1.0582	—	—	—
2	1.5445	1.0579	—	—	—
3	1.5430	1.0571	—	—	—
4	1.5445	1.0592	—	—	—
5	1.5462	1.0600	—	+	—
6	1.5460	1.0637	—	+	—
7	1.5460	1.0640	—	++	—
8	1.5480	1.0642	—	+++	—
9	1.5425	1.0600	—	++	—

IV— *Study of Non-Terpenic Fractions of Bay Oil separated by fractional Distillation.*

Fractions of Bay Oil obtained by fractional distillation of the complete oil were further studied and purified by chromatographic adsorption with the idea of separating other constituents besides terpenes, such as citral, phenols, etc.

Nine fractions were obtained; four of the fractions have been thoroughly studied, and found to consist of α-pinene, myrcene, dipentene, α-α-pellandrene, cineole and traces of citral and phenolic compounds in the tail fractions. This work is informed in a previous publication (1).

18 cc of fraction 5 were separated by chromatographic adsorption using silicic acid and heavy and light petroleum ether as eluant. The main fraction consisted of citral, which was spotted by Schiff's reagent and identified by its semicarbazide, m.p. 168°C. Traces of cineole were spotted in the first fractions and a very small last fraction consists chiefly of eugenol, identified by its benzoyl derivative, m.p. 69°.

Table 4 which follows gives a description of the fractions.

It can be seen from Table 4 that fraction 5, which was separated from bay oil by fractional distillation, at b_{20} 110-120°C, consisted chiefly of citral with some traces of cineole which were removed by chromatographic absorption.

To see, if it was possible, to isolate, as well as, determine citral by chromatographic methods, in fractions of bay oil, sub-fractions (b-e) of fraction 5, in which the presence of citral was indicated with fuchsin reagent, were further chromatographed in a silicic acid column using benzene as a developing solvent and detected by Schiff's reagent. This method has been previously used by La Rosen (3) with other aldehydes to determine their R value (R is the rate of movement of the zone relative to developing solvent). He found that the side chain acts as a hindrance to adsorption and thereby leads to an increase in the value of R with increasing number of carbon atoms and that aldehydes with double bonds (such as crotonaldehyde) produces a stronger adsorption that would be observed for the corresponding saturated compounds. Using this reagent which produces a pinkish violet color with the citral, it was possible for us to determine the purity of the fraction and its rate of adsorption and movement. Increased movement of the zones was obtained with 1% methyl alcohol added to the solvent.

Fraction 6 was separated by chromatographic adsorption following the same method used for fraction 5. It separated into three main fractions the largest fraction consisting chiefly of phenolic compounds, and a very small amount of citral. Phenolic constituents will be further purified using phenyl azobenzoyl chloride, reagent used for the identification and chromatographic separation of colorless compounds, amongst them phenols. (4).

VI— *Chromatographic Study of Non-Terpenic fraction.*

Non-Terpenic fraction separated by chromatographic adsorption on silicic acid using heavy and light fractions of petroleum ether as the solvent and eluant (3) indicated that about 69.60 percent of bay oil classified as non- terpenic consisted mainly of phenols (97.5%) with a small percentage of cineole and citral which were spotted in the first three fractions of the Non-Terpenic part of the oil.

Since chromatographic absorption seems to be the most suitable method of phenolic isolation, giving fractions well separated and pure, further work will be carried out to arrive at methods of separating the pure phenolic constituents of bay oil, mainly eugenol and chavicol.

Acknowledgement

Routine work involved was carried out by Mrs. Jovita R. de Gonzáles, Junior Researchist.

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Solubilisation

Solubilisation is a convenient method of rendering substances of low intrinsic solubility more suitable for administration and presentation as pharmaceutical preparations. This paper outlines the theory and application of surface-active agents to this phenomenon.

BY C. D. MOORE AND MAURICE BELL

First, it is as well to distinguish between true solubilisation, hydrotropy and emulsification, because the results of the three phenomena may, on occasions, be apparently similar. True solubilisation is the name given to the phenomenon by which products of low aqueous solubility are rendered seemingly water-soluble by the use of surface-active agents, whereas the term hydrotropy refers to solubilisation by means of the addition of large volumes of a solvent, e.g., alcohol to water and essential oils. Hydrotropy is thus merely the making use of a diluted organic solvent, though the process may be rendered more efficient if the solute will complex with the solvent, providing the solvent itself is sufficiently hydrophilic to render the whole soluble. The polyethylene glycols[1, 2] have this property to a marked degree, and although it is not appropriate to deal with the subject at length here, it is well worth consideration in certain cases if for any reason surface active agents are precluded. Emulsification can be distinguished from both solubilisation and hydrotropy by the fact that normally an emulsion is opaque or at the best only semi-transparent, whereas the other two phenomena are evidenced by solutions which appear completely transparent to the naked eye.

True solubilisation was first mentioned in literature by Peroz, 1846, and since then a large number of reports have been made by various workers on, for example, the solubilisation of cholesterol, oil dyes, excess fatty acids in soaps, etc. Serious scientific study, however, dates from about 25 years ago when the synthetic detergent industry began to develop. Before proceeding to the theories of solubilisation a description of surface-active agents will be of value.

The wide range of products suitable for solubilisation comprises the following:

(*a*) ANION ACTIVE.—The active portion resides in the anion and consequently is the long chain portion of the molecule, e.g., soaps, sulphated alcohols, alkyl aryl sulphonates. A special class is the alkylolamides, mentioned later.

(*b*) CATION ACTIVE.—The active portion residing in the cation, e.g., quarternary ammonium compounds, amine salts, etc.

(*c*) AMPHOLYTES.—These compounds exhibit both anionic and cationic properties according to the *p*H in a similar manner to all amphoteric substances, e.g., long-chain betaines and alkylamino acids.

(*d*) NON-IONICS.—This type of product is water-soluble by reason of a plurality of either ether of hydroxyl groups, e.g., ethylene and propylene oxide condensates, sugar esters.

All surfactants lower surface tension in solution and tend to orientate preferentially at surfaces or interfaces, thus there is always a tendency to "escape" from solution. This is due to the lack of attraction between the fatty chains and water, rather than the cohesive (Van der Waals) forces between the fatty chains themselves. Tendency to orientate at surfaces is responsible for the reduction of surface tension among other characteristics.

Theory of Solubilisation

The suggestion of micelle formation was first put forward by McBain in 1913[3] in an effort to relate anomalies between the osmotic pressure and electrical conductivity of an aqueous solution of potassium stearate. The osmotic activity was low, thus indicating fewer particles than were expected, while the conductivity remained at a relatively high value. He envisaged large numbers of the soap molecules associating in such a way that the fatty chains were grouped together, while their polar heads were orientated outwards to the aqueous phase, the inside of these micelles being almost wholly hydrocarbon. Consequently one can imagine comparatively large, discreet "islets" of hydrocarbon being dispersed through the solution and apparently so independent that they can be almost considered as a second phase. It is in these "islets" of hydrocarbon that substances may be solubilised. It is generally considered that, upon solubilisation, hydrocarbons are associated in the micelle almost wholly in the fatty centre, whereas those substances showing some degree of polarity, e.g., alcohols, tend to be associated with the outer, polar portions of the micelles. Micelles are not a permanent feature of solutions of surfactants, and their formation depends upon minimum limiting concentrations below which the surfactant exists only as single molecules as in a normal solution. The concentration at which micelle formation begins to occur is known as the critical micelle concentration (C.M.C.). The C.M.C. can be determined by various methods such as electrical conductivity, refractive index, surface tension, change of colour of dyestuffs, etc., and for all surfactants irrespective of constitution the C.M.C. decreases as the chain length increases. The table below illustrates this point.

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TABLE A

	Chain length	C.M.C.
Fatty acid soaps	C 8	0·39
" " "	C 10	0·098
" " "	C 12	0·0255
" " "	C 14	0·0066
" " "	C 16	0·0018
Na alkyl sulphonates	C 8	0·155
" " "	C 16	0·0009
Alkylamine HC1	C 10	0·04
" "	C 18	0·0025

As solubilisation depends on the presence of micelles in solution, it is obvious that solubilisation will not take place below the C.M.C., and the amount that is in solution will be due to intrinsic aqueous solubility only.

Shape of Micelles

The actual shape of micelles is still a matter for debate, but all the conceptions of the shapes are broadly variations of two forms: (1) McBain laminar micelle (diagramatically shown in Fig. 1), (2) Hartley spherical micelle (shown in Fig. 2).

Micelles contain anything from 5 to 200 molecules of surfactant. It has been shown, by means of X-ray examination, particularly by Harkins, that the micelles swell considerably when solubilising hydrocarbons, but not with substances of fairly high polarity. This phenomenon tends to support the accepted views as to where the solubilisates are associated. It has been suggested by McBain that smaller types of micelles (Fig. 3) occur just below the C.M.C. as evidenced by an increase in electrical conductivity. The positive charges associated with the micelles to correct the electrical balance are now known generally as gegenions or counter ions. It is possible to make a number of generalisations based on the experimental efforts of various workers as follows:

(1) In a homologous series, the amount solubilised decreases as the chain length of the solubilisate increases, e.g., hexane and octyl alcohol are more readily solubilised than dodecane and octadecyl alcohol respectively.

(2) Increase in polarity of solubilisate increases the amount solubilised; evidence of this is presented in Table *B*.

TABLE B

Solubilisate	Quarternaries C 12	C 14	C 16	C 18
	Amount solubilised Gm. per 10 gm. of agent			
Phenylethyl alcohol ...	16·5	17·6	15·5	14·7
Phenylethyl acetate ...	4·8	4·8	4·5	4·2

	Diethanolamides C 8	C 10	C 12	C 14
	Gm. per 10 gm. of agent			
Phenylethyl alcohol ...	4·7	5·0	5·4	3·6
Phenylethyl acetate ...	1·6	2·9	1·3	0·9

Non-ionics	Ethoxyl units 10	14	18	24	30	45	60
Hexadecyl polyglycol ether	Gm. per 10 gm. of agent						
Phenylethyl alcohol	6·5	7·5	8·3	7·6	6·5	5·7	5·4
Phenylethyl acetate	2·9	2·2	1·9	1·9	1·6	1·3	0·9

(3) Unsaturation and cyclisation of the solubilisate also tends to increase the amount solubilised. For example, Klevens[4] showed that solubilisation of *n*-hexane, cyclohexane and benzene in 0·63 *N* potassium laurate are approximately in the ratio of 1:2·5:3, and ethyl benzene and styrene in ratio of 1:1 2.

(4) The addition of inorganic salts to a solution of surfactant increases the amount of non-polar substances and decreases the amount of polar substances solubilised. Substances having comparatively high intrinsic solubility in water alone, e.g., polar substances, will have their true water solubility affected by salts simply by salting out. Low polar substances, having low true solubilities in water will naturally be less affected. Electrolytes also decrease the C.M.C. which, in addition, favours hydrocarbon solubilisation. Hutchinson[5] suggested that salts would reduce inter-ionic charges between the polar heads giving relaxed micelles, thus affording increased solubilising volume. This again would favour hydrocarbon solubilisation. It should be pointed out, however, that if the amount in true solution be subtracted from the total amount solubilised, it is not strictly correct to say that the amount solubilised decreases as the chain length of solubilisate increases. In fact, increasing molecular size of hydrocarbon will favour more efficient solubilisation, and alcohols the opposite, although the overall amount solubilised may well be less, due to a product of high molecular weight being less soluble in both phases.

(5) In the non-ionics, which are the only class of surfactants in which the hydrophilic and lipophilic portions can be varied independently, the more lipophilic members favour maximum solubilisation of low polar substances and the more hydrophilic members favour solubilisation of more polar substances. It would be expected that, providing sufficient solubility is retained when the solubilisate has been added, the surfactant with the largest proportion of fatty chain would solubilise hydrocarbons most efficiently. Substances of higher polarity tend to associate more with the polar portions of the micelle and, therefore, rather more polarity in a non-ionic surfactant would favour increased solubilisation of fairly polar molecules. These effects are illustrated in Table *C*, the hydrocarbon being most soluble in the product containing the smallest number of oxyethylene groups and the alcohol in a product containing 18 oxyethylene groups.

TABLE C

Number of oxyethylene groups ...	Hexadecyl polyglycol ethers 10	14	18	24	30	45	60	Water —
Phenylethyl alcohol ...	6·5	7·5	8·3	7·6	6·5	5·7	5·4	1·6
Diphenyl methane ...	3·06	2·04	1·7	1·36	0·68	0·68	0·34	—

(6) Broadly speaking, above the C.M.C. the amount solubilised increases in proportion to the concentration of surfactant and the total solubilised can be estimated if the true aqueous solubility of the solubilisate is known. In Table *D* two examples are given of compounds where the true aqueous solubility is known with fair accuracy, i.e., benzaldehyde and phenylethyl alcohol. It will be seen that the amount absorbed in the micelles at various concentrations is approximately in direct proportion to the concentration. It must be remembered, however, that these figures are taken at well above the C.M.C.

TABLE D

	Phenylethyl alcohol in 100 mils hexadecyl 24 oxyethylene glycol ether solution			Benzaldehyde in 100 mils hexadecyl 15 oxyethylene glycol ether solution		
Concentration of non-ionic ...	% 10	% 5	% 2·5	% 10	% 5	% 2·5
Amount in true solution ...	1·60	1·60	1·60	0·33	0·33	0·33
Total amount solubilised ...	8·28	5·04	3·24	4·13	2·40	1·38
Amount in micelles ...	6·68	3·44	1·64	3·8	2·07	1·05

Inverted Solubilisation

Solubilisation of water in organic solvents with the aid of surfactants is a parallel effect to normal solubilsation with all the aspects inverted, e.g., micelles have their paraffin chains oriented outwards to the solvent and their polar heads are associated at the centre. Micelle formation in solvents is supported by the fact that sodium and calcium soaps in organic solvents are optically anisotropic whereas aluminum and magnesium stearates are optically isotropic. The first suggests formation of micelles, while in the case of the latter the substances are in true solution. The first two absorb water, the last two do not. The balance of fatty component to polar heads (hydrophile/lipophile balance) plays a similar part as in ordinary aqueous solubilisation. Evidence of this is shown in Table *E*[6].

TABLE E

Solubilisation of water in xylene

Dodecylamine salt 20 per cent. xylene solution	Moles water solubilised per moles of salt
Formate	0·9
Acetate	2·04
Proponiate	8·22
Butyrate	27·9
Laurate	5·35
Oleate	3·12

Comicellisation, a term recently introduced by Valko and Epstein[7], refers to a special type of solubilisation. Comicellisation may be described as the orientation into micelles of a randomly distributed mixture of soluble and insoluble materials, whereby the polar heads (e.g., OH, COOH) present maximum surface area to the aqueous phase, thereby an optimum configuration for solubility is obtained. The alkylolamides are a particular example of this type of solubilisation.

Advantages and Disadvantages

Disinfectants may be used as illustrations both of the advantages and disadvantages of solubilisation. The action of phenols and iodine are governed by Ferguson's principle[8] in being structurally non-specific and being dependent upon physical properties which favour preferential accumulation in the organism. They are dependent on the relative degree of saturation in the solvent vehicle, i.e., water as against the lipoid portions of the organism. It is clear that this type of disinfectant will be very sensitive to any agent which tends to change the relative degrees of saturation. Curve *A* in Fig. 4, where the surfactant is ordinary soap shows that at first there is a considerable increase in bactericidal activity, but as the proportion of soap is continually increased, total incorporation in the micelles eventually ensues, and the organism is shielded from the bactericide. Curve *B* in Fig. 4 illustrates the effect of the solubilisation of iodine in water by a non-ionic surfactant. First there is an increase in bactericidal activity as with soap and phenols, but irrespective of the amount of non-ionic used, the activity never falls to zero. This is undoubetely due to the appreciable vapour pressure of iodine in organic materials which allows it to reach the receptors.

These curves emphasise the importantce of ensuring that activity is maintained on solubilisation. It may be asked whether it is possible to predict if a substance will be inactivated or not by solubilisation in water by a surfactant. We are unaware of any published literature which attempts to give guidance on this matter and the following is, therefore, our own opinion, to be modified in light of any experimental work which may appear.

(*a*) A substance which is oil-soluble and of low aqueous solubility, and which is generally applied from an oleaginous vehicle will generally remain active on solubilisation.

(*b*) If a substance is both oil- and water-soluble and is applied from an aqueous solution, then if the product is structurally specific, the solubilised product will remain active, but if the solubilised product depends on relative degrees of saturation between the vehicle and the receptor, then it is likely that at first an increase in activation will take place, to be followed by inactivation.

There are very few simpler operations than that involved in actually solubilising a product providing the appropriate surface-active agent has been chosen. Probably the most generally useful surface-active agents for this purpose are those of the non-ionic type. In practice the material to be solubilised is mixed with the selected non-ionic (melted, if necessary), a small quantity of water is added and the mixture stirred until homogeneous; further water is added gradually until the correct dilution is obtained. In the case of anionics, cationics, and ampholytes, this method is not suitable. Instead, the product is solubilised in as concentrated a solution as possible of the surface-active agent; the mixture is then adjusted to volume. In this connection it is important to realise that there are cases where solubilisation cannot be effected at dilute concentrations because the aqueous phase presents an impenetrable barrier to the hydrophobic substance.

Solubilisation of vitamins is now standard practice; not only are the final preparations free from the limitations of vitamin emulsions, but they are also much more resistant to oxidation and to the effects of actinic light on storage. The addition of non-ionic surface-active agents to preparations such as Gee's linctus, will render the balsamic bodies soluble and produce a clear product. Various other medicaments such as camphor, parafinic bodies, methyl salicylate, chloroform, and essential oils, may be solubilised in water, and non-greasy preparations readily obtained. An important part is played by solubilisation in the production of disinfectants[9], for example, liquor chloroxylenolis in which the surface-active agent was castor oil soap. The solubilisation of phenolic compounds has been accomplished by the aid of various types of surface-active agents, and, more recently the "isodophors" solutions of iodine solubilised in water by means of various non-ionic surface-active agents have been given a great deal of attention. Increasing interest is being shown in the solubilisation of perfumery materials since it offers a simple and practical way of preparing perfumed articles for many purposes[10]. The extraction of crude drugs and flower oils by taking advantage of the solubilising effect of solutions of surface-active agents is a distinct possibility for the near future. In agriculture alkyl sulphonates are used to solubilise chlorphenols, and non-ionics for malathion. Solubilised colours are employed in tinting fruit. An example of inverted solubilisation is provided by the use of a solution of water in trichloroethylene for the removal of water-soluble stains in the dry-cleaning of garments. It is possible that organic solvents containing solubilised water might be used with advantage, under certain circumstances, in place of ether soaps and surgical spirit.

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The Preparation of Tertiary Alcohols

Part I

DR. KURT KULKA*

There is a marked difference in the chemical behaviour of primary and secondary alcohols when compared to tertiary alcohols. Whereas primary alcohols would result from the hydrogenation of aldehydes and secondary alcohols from ketones by the same process, tertiary alcohols cannot be derived from carbonyl compounds under identical conditions.

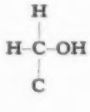
Alcohols and their derivatives, particularly esters, are widely distributed in nature. They are found in essential oils as well as among the aromatic components of animal products, where they contribute to a large extent to the organoleptic properties of these materials.

We classify alcohols according to their origin as naturally occurring or synthetic alcohols. The latter can be either a reproduction of a natural product or be entirely of a synthetic nature.

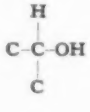
The functional group characteristic for alcohols is the hydroxyl group: -OH.

Chemically alcohols are classified as:

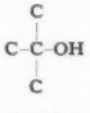
1. primary alcohols: The carbon holding the hydroxyl group is attached to another carbon and two hydrogen atoms.



2. secondary alcohols: The carbon holding the hydroxyl group is attached to two other carbons and one hydrogen atom.



3. tertiary alcohols: The carbon holding the hydroxyl group is attached to three other carbon atoms.



There is a marked difference in the chemical behaviour of primary and secondary alcohols when compared to tertiary alcohols. Whereas primary alcohols would result from the hydrogenation of aldehydes and secondary alcohols from ketones by the same process, tertiary alcohols cannot be derived from carbonyl compounds under identical conditions. Vice versa, primary alcohols give aldehydes on oxidation and secondary alcohols give ketones, whereas tertiary alcohols are resistant to the same treatment. Primary and secondary alcohols are generally classified as stable compounds, while tertiary alcohols are considered to be most labile and are easily dehydrated to the unsaturated hydrocarbons. These particular properties of tertiary alcohols are often used for their identification.

In recent years much research has been centered around tertiary alcohols. The elucidation of the chemical structure of some of these compounds—based partly on their syntheses—and the development of commercial syntheses for some of these alcohols verify their importance from an academic as well as from a commercial point of view.

The following is intended to outline some of the more important chemical reactions by which tertiary alcohols can be prepared.

1. The hydration of olefins to alcohols.
2. The Bertram-Walbaum reaction.
3. The Aschan reaction.
4. Tertiary alcohols from alkyl- or aralkyl halides.
5. The Grignard reaction.
6. Tertiary alcohols from the interaction of a halide with an ester (with sodium).
7. The Reformatsky reaction.
8. Tertiary alcohols from peroxides.
9. Reduction of epoxides to alcohols with lithium aluminum hydride.
10. Tertiary acetylenic alcohols from ketones and acetylene.

The Hydration of Olefins to Alcohols

The direct hydration, i.e. the addition of the elements of water, is generally carried out with the aid of a rather strong acid catalyst, such as 50—90% aqueous sulfuric acid, concentrated hydrochloric acid, a sat-

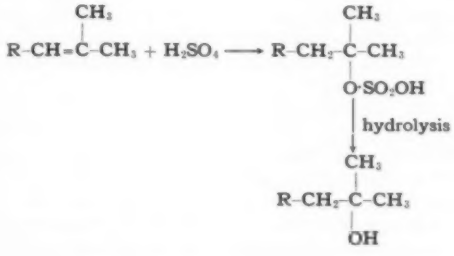
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urated solution of sodium or potassium bisulfate, or in the case of easily hydrated substances, with an aqueous solution of oxalic acid.

The influence of sulfuric acid on olefins was observed by Faraday as early as 1826 and was studied by Berthelot in 1863. The availability of many olefinic compounds, obtained from the cracking processes of petroleum, is responsible for the broad application of this reaction and its more recent improvements. Thus a great number of alcohols, previously prepared with difficulty, are now readily available.

With the exception of ethylene, a secondary or a tertiary alcohol, according to the structure of the olefin, is obtained by this process. The reaction follows Markownikoff's rule, i.e. the hydroxyl group will attach itself to the carbon (of the double bond) having the least number of hydrogen atoms. The peroxide effect does not apply to this reaction.

When the reaction is carried out with sulfuric acid, it is believed that the effect is not purely catalytic, but that an alkyl hydrogen sulfate is produced, which is hydrolyzed to the alcohol.



The following reaction will be influenced by the following factors:

1.) structure of the olefin,

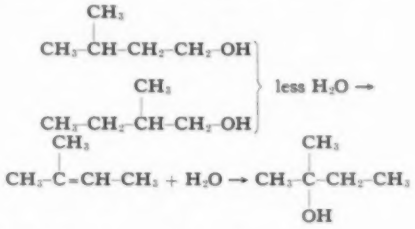
2.) concentration of the acid catalyst,

3.) reaction temperature and reaction time.

The polarity of the double bond has a decisive influence on the rection (1). For example, asymmetric, disubstituted olefins of the type of isobutylene lend themselves well to this reaction. The influence of the ion concentration was studied by Lucas et al. (2) and by Brooks and Humprey (3). A high ratio amount of a concentrated acid to the olefin should be avoided, because it is apt to cause the formation of dialkyl sulfates which on hydrolysis will yield ethers. The choice of the reaction temperature is greatly influenced by the structure of the olefin. While reactive compounds can be hydrated at low or normal (room) temperatures, less reactive compounds will require elevated reaction temperatures. The possibility of side reactions should also be considered in certain cases. This might necessitate low temperatures over a prolonged reaction time. The reaction time should be adjusted in accordance with the variables above mentioned. For example, isobutylene will hydrate with a rather dilute aqueous sulfuric acid solution at room temperature in a relatively short reaction time.

A General Example

A general and illustrative example of the reaction is the preparation of tertiary amyl alcohol from a mixture of amyl alcohols (fusel oil) which was described by Adams, Kamm and Marvel (4). The mixture of primary alcohols is first dehydrated with sulfuric acid to the olefin (amylene) which is then hydrated with dilute sulfuric acid to the tertiary alcohol.



The hydration is carried out as follows:

500 g. concentrated sulfuric acid are added to 500 g. cracked ice. The resulting solution is cooled to 0° C and 500 cc amylene are added gradually under agitation through a dropping funnel. After the addition, agitation is continued for ½ hour. Some unchanged hydrocarbon is separated. The remaining solution is added to 2 Kg. water and cracked ice, and neutralized by the gradual addition of 720 g. concentrated aqueous sodium hydroxide solution. The mixture is distilled until no more alcohol separates from the distillate, by salting out with potassium carbonate. From 325 g. amylene, 275-300 g. tertiary amyl alcohol is obtained.

Organic hydrogen ion exchange resins are used as catalysts for the hydration of iso-olefins (isobutylene-isododecylene) (5). This process is conducted at elevated temperature and under pressure.

Hydration processes are of prime interest to our industry. Terpene compounds (having functional groups in their molecule) and terpene hydrocarbons, many of them by-products of essential oil rectifications by fractional distillation, become, after introduction of the hydroxyl group, new and highly valued "aromatics". Such a compound is hydroxycitronellal, the hydration product of citronellal, which has an aldehyde and a tertiary alcohol group in the molecule. In this connection, the hydration of pseudo-ionone as applied by Knoll & Co. (6) should be mentioned. In this process the bisulfite addition compound of the carbonyl group is formed, before proceeding with the hydration (under acidic conditions), thus avoiding the cyclization of pseudo-ionone to ionone. The same idea is the guide for the preparative methods described in the literature for hydroxycitronellal, where the bisulfite addition compound of citronellal is formed first (to prevent cyclization of the aldehyde to isopulegol) before proceeding with the acid hydration process. In a later patent (7) Knoll & Co. describe the hydration of other olefin compounds having a carbonyl group in their molecule, such as carvone, citronellideneacetone and citrylidenemalonic ester, using the above described technique (citronellal or hydrocitronellal are not mentioned).

Another example which illustrates the great importance of hydration processess to our industry is the synthesis of terpineol. This tertiary alcohol can exist in three isomeric forms: α-terpineol, β-terpineol and γ-terpineol. The most valued of these three forms is α-terpineol which is found in many essential oils either in one of the two optically active forms or as the optically inactive dl-α-terpineol. Beta terpineol has not been detected in natural products and γ-terpineol was found in small amounts in the oil of the leaves of Cupressus torulosa by Simonsen (8).

The commonly used synthesis of terpineol starts from a mixture of α- and β-pinene which is hydrated to terpin hydrate. On partial dehydration a mixture of isomeric alcohols is obtained, in which α-terpineol predominates. The presence of β-terpineol in this mixture was proven, whereas the presence of γ-terpineol and

1-methylene-4-iso-propylcyclohexan-8-ol is doubtful.

This process was first applied by Wallach (9) and its principles are still the basis for many of the modern processes. Numerous modifications and improvements were made in the course of the following years; for example, conducting the hydration step in a mutual solvent for the hydrocarbon and the acid solution, or the addition of an emulsifying agent which is active under acidic conditions.

The partial dehydration of terpin hydrate to terpineol is accomplished according to Norton (10) by heating terpin hydrate to 117-200° C with water which is acidified to a pH of 3.4-6.9 with carbon dioxide. A stream-lined procedure was given by Sapp, Gillespie and McKim (11).

1 Kg. of turpentine is mixed at a temperature of 0-5° C with 1.08-2.88 Kg. of 60% sulfuric acid. At maximum viscosity the mixture is added directly to an alkaline solution. A slurry is formed consisting of some free acid, terpin hydrate and a concentrated aqueous salt solution. The mixture is boiled to dehydrate the terpin hydrate and the crude terpineol is obtained in a yield of 80-92% of the theory.

A novel and interesting preparation of β-terpineol from terpin hydrate was decribed by Aratani and Matsuura (12), which consists in the formation of the diacetate of terpin hydrate, which on thermal decomposition gives β-terpinyl acetate. On saponification of the latter, β-terpineol is obtained.

A mixture of 600 g. acetic anhydride, 172.5 g. sodium acetate and 200 g. terpin hydrate are agitated at 135° C for 3 hours. The reaction mixture is neutralized with a saturated sodium carbonate solution and then steam distilled to separate unreacted terpin hydrate. The steam distillate is extracted with ether, the extract washed with water and dried. Fractionation yields: 61% terpin diacetate and 29% β-terpinyl acetate. The terpin diacetate is refluxed for 5 hours and then fractioned, yielding 46% β-terpinyl acetate and 25% unreacted terpin diacetate.

The direct hydration of a suitable unsaturated hydrocarbon to terpineol will give an alcohol (mixture of alcohols) having the same optical activity or racemic form as that of the starting material. In this connection, the sensitivity of certain unsaturated hydrocarbons to mineral acids should be mentioned. With phellandrene, for example, isomeric hydrocarbons are obtained, not the alcohol. Limonene, which is one of the optical forms of dipentene, has to be hydrated in the cold in order to avoid the formation of terpinene and p-cymene.

In comparison to the previously outlined partial dehydration of terpin hydrate, direct hydration of unsaturated hydrocarbons to terpineol is of secondary importance. To be mentioned is the hydration of dipentene to terpineol with dilute sulfuric acid as described by Bertram and Walbaum (13) in 1892. In a more recent process as described by Sheffield (14) a mutual solvent for the hydration and the acid solution is used.

A solution of 1,000 g. turpentine (pinene), 800 g. 32% aqueous sulfuric acid and 500 g. acetone is reacted for 9 hours at 40-45° C. The bottom acid layer is separated, the upper organic layer neutralized, washed with water and worked up in the usual way.

Since 1909, old stumps from previously cut longleaf yellow pine trees have been a source for terpineol. The wood is shredded, then steam distilled or extracted. On distillation in vacuum, three main fractions are obtained: turpentine. dipentene and pine oil. The last fraction, boiling at 180-215° C, contains up to 50-60% α-terpineol. This alcohol is separated from the other components of this fraction, such as borneol, fenchol and hydrocarbons. The separation consists usually of boration, to separate the alcohols, fractional distillation and freezing out the terpineol.

A booklet "Terpenes and Related Pine Chemicals", issued in 1957 by Hercules Powder Co., gives information regarding their various grades, purities and composition of commercial α-terpineols and related products.

The Bertram-Walbaum Reaction and Related Processes

Under the catayltic influence of a small amount of sulfuric acid, olefins react with carboxylic acids to form esters. This process is known as the Bertram-Walbaum reaction and was reported by its authors in 1893 (15).

Olefins having a tertiary carbon at the double bond, such as isobutylene or isoamylene are particularly inclined to undergo this reaction. Thus tertiary isobutyl acetate can be prepared as follows: A slow steam of isobutylene is introduced into a solution of 40 cc. (0.7 moles) of acetic acid, 28 cc. dioxane and 2.5 cc. concentrated sulfuric acid. After this solution has gained 8 g., indiating the adsorption of 0.14 moles of isobutylene, the reaction mass is let stand for several days, diluted with water, extracted with ether and worked up in the usual way, to give a 95% yield, i.e. 96.3 g. to 97.2 g. of the acetate.

One of the best known examples of the Bertram-Walbaum reaction is the preparation of isobornyl acetate which is obtained from this reaction of camphene and acetate acid, with a catalytic amount of dilute sulfuric acid. In the course of the reaction, the expected tertiary alcohol, i.e. camphene hydrate, is probably formed, which under the conditions of the reaction rearranges and the acetate of the secondary alcohol, isoberneol, is obtained.

Besides sudfuric acid, other catalysts can be used to bring about the reaction of olefins with carboxylic acids.

Zinc chloride was used by Kondakov (16) who reacted 3-5 g. zinc chloride, 25 g. of the olefin and the molecular equivalent of a carboxylic acid at 20° during a 20 hour period.

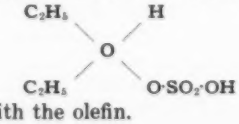
Boron fluoride in an amount of 6-10% is an effective catalyst in this process and was used by Meerwein (17) and Dorris, Sowa and Nieuwland (18). It is interesting to note that from the reaction of acetic, mono-, di-, and trichloroacetic and benzoic acids with propylene, using boron flloride as the catalyst, the corresponding isopropyl esters are obtained.

According to Milas (19), a great variety of catalysts can be used in this process, such as: benzenesulfonic acid, potassium bisulfate, cuprous chloride. Milas treated aliphatic unsaturated terpenes, particularly mycrene, ocimene and alloöcimene with a carboxylic acid and one of the above mentioned catalysts with an inert atmosphere in a solvent at 50-60° C, and claimed to have obtained selective hydrations.

The Aschan Reaction

The hydration of olefins with a mixture of equimolecular amounts of diethyl ether and sulfuric acid monohydrate is known as the Aschan reaction and was reported by its author in 1919 (19).

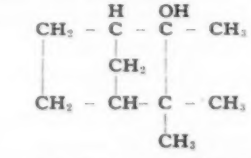
Aschan advanced the theory that diethylether and sulfuric acid monohydrate form diethyloxoniumsulfate



which reacts with the olefin.

To carry out the reaction, 1 mole of sulfuric acid monohydrate is added gradually, under efficient cooling to 1 mole of dry ether. This reagent is added in 3 portions, under cooling, to 0.9 mole of the unsaturated compound. After addition of each portion, the source of cooling is removed to permit the reaction temperature to rise to 20° C. After completion of the reaction, the reaction mass is permitted to stand for some time at room temperature, then it is decomposed with dilute sodium carbonate solution. The ether is distilled off and the alcohol is liberated.

By applying the Aschan reaction it was possible to obtain camphene hydrate (20).



in contrast to the Bertram-Walbaum reaction which yielded the acetate of isobornyl alcohol.

Asahina and Tsukamato (21) used the Aschan reaction for the hydration of caryophyllene and obtained besides the α- and β-alcohol a mixture of clovenes. Lutz and Reid (22) investigated this process and proceeded as follows:

900 g. concentrated sulfuric acid are added at 0° C dropwise to 1,700 cc. diethyl ether. To this solution is gradually added 3 Kg. caryophyllene (rectified) at a reaction temperature maintained below 10° C. The mixture is kept over night, neutralized carefully by adding 3,000 g. of a 20% sodium hydroxide solution, followed by the gradual addition of 600 g. sodium hydroxide flakes. Then the total volume of the reaction mixture is brought up to 9,000 cc. by adding water. The reaction mass is treated with steam, preheated to 160° C to obtain: 1,082 g. solid β-caryophyllene alcohol and 1,477 g. crude clovenes.

When the steam distillation is carried out at 100° C also a small amount of α-caryophyllene alcohol is formed.

Certain hydrocarbons do not lend themselves to the Aschan reaction. Thus dipentene and α-pinene give only polymers.

Tertiary Alcohols from Alkyl- or Aralkyl-Halides

Alkyl or aralkyl halides are prepared for practical reasons by 1. the halogenation of certain hydrocarbons such as toluene, 2. the addition of hydrogen halides to an ethylenic linkage.

The first possibility is only of limited interest here and is therefore mentioned only briefly. Halogens in the α-position to an aromatic ring are known to lend themselves well to hydrolysis. Thus benzyl alcohol can be readily prepared by the hydrolysis of its chloride.

Of greater importance for the preparation of tertiary alcohols is the second possibility.

The addition of a hydrogen halide follows Markownikoff's rule, i.e., the halogen will affix itself to the carbon carrying the least number of hydrogens, whereas the hydrogen adds to the other carbon atom of the double bond. This rule can, however, be reversed by adding a small amount of a peroxide, a phenomenon discovered by Kharasch in 1933 (23). The direction of the hydrogen halide addition can also be often changed by carrying out the reaction in a selective solvent system. For example, hydrogen iodide adds to propylene to give mostly 2-iodopropane. When, however, the reaction is carried out in acetic acid solution, the main product is 1-iodopropane.

The addition of hydrogen chloride (hydrocloric acid) to the double bond generally proceeds more sluggishly than those with hydrogen bromide (hydrobromic acid) or hydrogen iodide (hydroiodic acid). Therefore, catalysts such as the chlorides of iron, cobalt, nickel or aluminum are sometimes used when hydrochloride acid is one of the reactants. To conduct the process under pressure is another way to enhance the rate of reaction.

The position of the double bond is important. Terminal double bonds are more prone to the addition of hydrogen halides than those in the middle of a chain.

The reactivity of alkyl halides to hydrolysis proceeds in the following order: tertiary > secondary > primary. The iodides are the most reactive, followed by the bromides and chlorides. To bring about hydrolysis to the alcohol, various bases can be used, such as sodium or potassium hydroxide, or potassium, sodium, lithium or barium carbonate. Particularly suitable for the hydrolysis of sensitive halides is an aqueous suspension of calcium carbonate or milk of lime.

In terpene chemistry the addition of hydrogen halides is of importance and many examples can be found in the well known standard books of Guenther (24) and Simonsen (25).

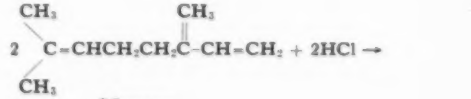
The reaction is usually exothermic and temperature control is necessary to avoid rearrangements. Thus camphene hydrochloride was obtained by Meerwein and van Emster (26) in the following way:

Purified camphene is dissolved in half its volume of absolute ether under efficient cooling with exclusion of moisture. About 1 mole of hydrochloric acid gas is gradually introduced. After a while crystals are formed and the ether is now gradually removed by a current of dry air. The crystals are filtered; their melting point is 126-127° C. The yield amounts to 70% of the theory. However, this product is impure and even a purified product will contain about 9% of the simultaneously formed isobornyl chloride.

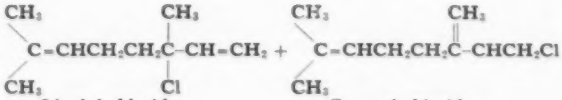
The preparation of mono hydroxy compounds of the terpene series was described by Howards and Sons Ltd., Huggett and Porter (27).

Thus, 136 lbs. of commercial phellandrene (about 70% pure) are cooled to 5° C and dry hydrogen chloride is passed in, until the weight increases 36.5 lbs. To the resulting solution, 42.5 gallons of a 15% alcoholic sodium hydroxide solution is added. The reaction mixture is kept for 24 hours at 0° C and then diluted with water. The separated oil is washed with water and fractioned at 4 mm. vacuum. The section boiling at 60-70° C amounts to 86 lbs. and is mostly piperitol.

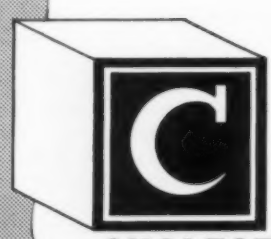
It is well known (28) that geraniol forms a chloride which is composed of approximately equal amounts of geranyl chloride and linalyl chloride. Bell, Kibler and Strickland (29) prepared this mixture of chlorides by the addition of hydrochloric acid to myrcene, in a nonpolar solvent, at a temperature of 35-40° C:



Myrcene



Linalyl chloride Geranyl chloride



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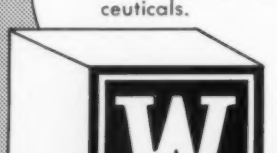


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This mixture of chlorides, called "myrcene hydrochloride" is treated with potassium acetate to yield an ester. If the reaction is carried out in acetic acid solution, the final product is chiefly geranyl acetate. If the reaction proceeds in acetic anhydride solution, linalyl acetate is the main product. A catalyst consisting of copper powder, cuprous chloride and potassium iodide is used in this process. Under best conditions a yield of 45-55% linalyl acetate is obtained.

Dihydrolinalool was prepared by Kitchens (30) in the following way: Myrcene was partially hydrogenated with a nickel catalyst to give dihydromyrcene. By adding hydrochloric acid gas to the ethylenic linkage of this compound, dihydrolinalool chloride resulted. On saponification dihydrolinalool was obtained.

The Grignard Reaction

The Grignard reaction proceeds in three steps:

1. Formation of the Grignard reagent.
2. Reaction of the Grignard reagent with a functional compound, called in the following the Grignard reaction.
3. Hydrolysis of the reaction product to liberate the alcohol.

As the Grignard reagent is able to react with almost any functional group, the Grignard reaction is one of the most versatile and fruitful methods in preparative organic chemistry.

The Grignard reagent is prepared from a halogen compound and magnesium in a solvent, usually diethyl ether, according to:

$$RX + Mg \rightarrow RMgX$$

According to Schlenk and Schlenk (31) the Grignard reagent in solution (Grignard solution) is an equilibrium:

$$2\ RMgX \rightleftarrows R_2Mg + MgX_2$$

After standing of the Grignard solution for some time, the magnesium halide often settles out as a fine, grayish precipitate.

Among the side reactions often occurring in the preparation of Grignard reagents, a Wurtz-type condensation is predominant. The formed magnesium halide reacts with one mole of the halide:

$$RMgX + RX \rightarrow R\text{-}R + MgX_2$$

To minimize this side effect, slow addition of the halide to the magnesium covered with ether and use of high dilutions are recommended.

Grignard solution can be assayed by the Gilman titration (32).

$$RMgX + H_2O \rightarrow RH + MgOHX$$
$$MgOHX + HCl \rightarrow MgClX + H_2O$$

The use of diethyl ether in preparing the Grignard reagent has a double effect:

a. Diethyl ether is a superior solvent for Grignard reagents and is also one of the best solvents for the subsequent Grignard reaction.

b. Diethyl ether acts as a reaction promotor.

Grignard explained the latter phenomenon with the formation of an etherate due to the participation of diethyl ether in the reaction of halogen compounds with magnesium:

(Continued on page 36)

Raw Materials And Finished Perfume Compounds

HARRY A. CUTTLER*

One must be very cautious in evaluating some of the claims now being made for the applications of instrumentation. The reason for using perfumery materials is odor, and the only way to detect odor is with your nose.

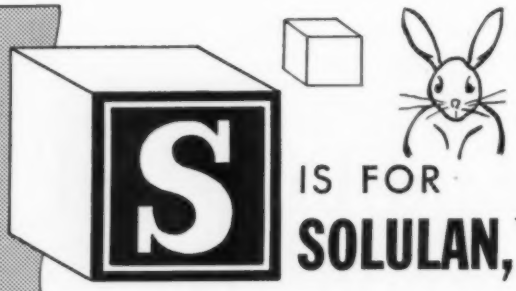
The wonderful advances in the science of analysis and synthesis by instrumentation, and its application to the field of perfumery, cannot be underestimated. Proper use of instrumentation has saved the analytical chemist hundreds of man-hours by eliminating many long and tedious routine physical and chemical analysis. Many analytical procedures can now be performed swiftly and accurately in a matter of minutes compared to hours before the use of instrumentation. Another example is the use of instrumentation where the research chemist can now work even closer with the perfumer in the selection of suitable isomers which, because of their special odors, are best suited for the problem at hand. I could go on to a long list of beneficial results which have accrued to us due to the proper use of instrumentation. However, this can be done, and has been done, by chemists far better qualified than I to touch upon this phase of the topic

One must be very cautious in evaluating some of the claims now being made for the applications of these wonderful instruments. Dr. Naves, in a very revealing paper read on February 20, 1957, before the Soc. Technique des Parfumeurs de France, points out that there are many fables in regard to the use of these instruments among those concerned with the study of raw materials for perfumery. The usual apparatus used for gas chromatography scarcely permits of the determination of the secondary constituents of a mixture as complex as that frequently displayed by an essential oil or distillate of a natural perfume below a percentage of 1 per cent. In vapor-liquid partition chromatography it is possible to distinguish only approximately the number of the principal constituents of the mixture, and the relative concentrations of these constituents can be ascertained only at the cost of a long and difficult preliminary calibration. Also, he points out that commercial spectrometers which are instruments whose resolving power is rather low, make it very difficult, in the spectrum of a somewhat complex mixture, to distinguish absorption or diffusion characterising a constituent present in a mixture in a proportion of less than two to three per cent. And he specifically stresses the fact that these spectrum investigations can only be used for interpreting the characteristics of mixtures when all the spectrally active constituents are known.

Please do not misunderstand Dr. Naves' position in regard to instrumentation, for some of his greatest work was materially aided by their use. The work of many chemists in discovering and synthesizing odorant material and their dependence upon instrumentation should not be underrated. Especially the work of various chemists in elucidating the component parts of various essential oils, and the detection of trace impurities in aromatic chemicals, commends great praise from perfumers. However perfumery itself is still too much of an art to lend itself easily to automation, and somehow, it seems to me, the actual art of perfumery is slowly being confined on all sides by the march of the chemists, his machines, and the inevitable correlary: the Association for the Setting-up of Analytical Standards for Everything for Everybody.

In the practical work of a perfumer there are basically three major problems to be solved. These can be stated as the creation of fragrances, the control of fragrances, and the manufacture of fragrances. In regard to the creation of fragrances, we must remember that the perfumer is primarily an artist. In creating the finished fragrance to be used by the consumer he usually will end up with a formula ranging from 50 to 150 items, all of which have a definite purpose for appearing in the final formulation. The reasons a perfumer selects to use lavender from Vaucluse in place of lavender from Barreme, or vice versa; the reason a perfumer prefers linalyl acetate from bois de rose or petitgrain oil; the necessity of using a rhodinol derived from Cer. Bourbon, rather than a synthetic rhodinol; all these choices are governed by the odor inherent in the particular substance chosen. While analytical methods proposed and adopted by official societies and pharmacopeias are useful in detecting gross adulterations and impurities, it is still very difficult to make more than a rough estimate in most cases as to the quality of an oil or chemical by subjecting it to chemical or instrumental analysis. Re-

*Perfumer, Revlon, Inc.
Presented at the 5th Annual Symposium of the American Society of Perfumers, April, 1959



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AMERCHOL PARK — EDISON, N. J.

cently many oils from newly cultivated lavendin botanical varieties have appeared on the market. These oils possess not only the physical constants of true lavender, but the majority of them contain more than 40 per cent esters; yet, olfactorily speaking, they are coarse of odor, more or less camphoraceous, and bear a strong similarity to lavendin. Unfortunately, to help confuse the situation, many specifications are drawn up so broadly as to be absolutely useless. Thus the perfumer has to rely upon his nose and his own sense of judgement as to whether certain oils will do the work he intends for them to do, regardless as to what the physical constants or infrared curves may show. A perfumer must take in many cases a very pragmatic approach in answering the question is this, or is this not, the best material. The absence or presence of certain constituents in natural raw materials, as well as trace impurities in aromatic chemicals, does not always necessarily indicate a superior or inferior quality. I have known certain large companies to reject or accept certain raw materials because of the presence or absence of various constituents, yet these constituents in no way affected the odor characteristics of the oil, or its performance in the end product. There seems to be a great fear of adulteration in raw materials. Undeniably there are good reasons for this fear. However, I would like to point out most natural oils cannot be adulterated profitably—please note "profitably" —and still pass a good perfumer's nose. No instrument can evaluate those trace components which give many of the perfumer's raw materials their raison d'etre more successfully than a perfumer's nose, and let no perfumer be intimidated by ester contents, infra-red curves, and the like when choosing a natural raw material for his next composition. Some of the greatest perfume creations in existence today were originally made with essential oils and aromatic chemicals which we today would term unclean, impure, or not up to official standards. Yet it was the ingenuity of the perfumer who was able to take these so-called impure materials in the dawn of modern perfumery and create classics which are still being sold and imitated to this very day. Some typical examples of yesteryear products which our modern chemists would scorn are yellow vanillin which actually has an aroma similar to the vanilla bean, as compared to pure vanillin; rhodinol, with its strong green character due to remnants of menthone and geranium terpenes, as compared to the pure rhodinol of today which, to my nose at least, is but a shadow of the life and lift inherent in the old-fashioned rhodinol.

Problem of Control

The problem of control to a perfumer is one almost as important as that of creating the perfume itself, for after he has made his creation, he must be able to reproduce it, over and over again, year in and year out. While instrumental analysis of raw materials is valuable, it should only be considered as supplementary to the perfumer's nose. A disheartening trend has been noted especially in the U.S.A. as compared to Europe in the tendency of certain companies to use these valuable instruments for the purpose of controlling perfume compounds. The use of these instruments for the purposes of controlling perfumery compounds and materials from the perfumer's point of view is, at best, rather difficult.

An interesting experiment was made with an ordinary floral bouquet. This floral compound was divided into 3 parts. To one was added 2% neroli of undisputed quality; to the second, a neroli of questionable pedigree; to the third, an outright artificial neroli replacement compound. All three samples were subjected to olfactory

examination. There was no hesitation in separating the three compounds by the type of neroli they contained. However, the infrared spectrophotometer failed to notice any significant difference.

Another experiment I would like to report is the use of Phenyl Ethyl Alcohol in rose compounds. Under instrumental analysis, very slight, almost insignificant differences can be seen between a good grade of PEA as compared to a highly refined sample, yet there is never a question in the perfumer's mind as to which PEA has the cleaner, truer odor and of course it is needless to say there is a world of difference in your rose composition if you should use one in place of the other.

And so we see some of the difficulties inherent in the use of instrumentation for control purposes. There is no machine that can tell when a certain lift or life is due to trace materials undetectable amongst the multitude of chemicals found in a normal perfume compound. No machine can tell you when an operator has put in .3 of methyl heptine carbonate, instead of .1 per cent in certain compounds; and many involved analyses in regard to the verity of certain raw materials can be resolved in very short order by subjecting them to the odor rather than the analytical test. While physical methods are important to control work, they should not be placed upon an altar. I cannot stress too much the importance of realizing that it is the odor, and only the odor, which is the reason for the raw material or the perfume compound's being. Of course some of you gentlemen might very well say that it is naive to claim that instrumental analysis can replace the olfactory sense. However, alas and alack, I beseech you to look around and see how many companies have adopted this presumption, forgetting that all physical and chemical specifications should be subservient to the analysis of odor acceptability.

It is common knowledge that essential oils from the same plants in the same area from the same plantation will give different analyses from year to year depending upon the condition of the soil, the weather, and other factors. Sometimes these physical and chemical constants will range above or below specifications set up by various associations. This is a natural phenomena and does not make the oil thus produced subject to suspicion of adulteration. The perfumer and especially the analyst must constantly take into consideration the facts that all raw materials which are derived from natural sources are bound to vary from year to year. Those companies which insist upon receiving from their suppliers essential oils with definite physical and chemical specifications are only kidding themselves because you and I know that these suppliers will be forced to turn to blending, sophistication, or outright adulteration in order to obtain the desired business. Mother Nature has no instrument to watch and no specifications to meet, and let no chemist feel that by setting up physical specifications he can force Mother Nature to conform.

Manufacture of Pure Chemicals

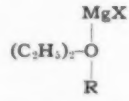
At this time I would like to draw attention to the problem of the manufacture of odors. I salute the hosts of chemists in hundreds of laboratories who are trying with the aid of modern instrumentation to create pure chemicals for the perfumer to use. However, I would like to offer a word of caution: choose your projects carefully. There are many arguments in favor of pure chemicals. For example, purity in an odor will give it a clean and simple note which will not exhibit any off notes upon drydown; thus we can deal with a single odor component. The problem of oxidation, of trace impurities such as terpenes and phenols, is eliminated or minimized, giving more stability to the aromatic chemical and of course reproduction and uniformity theoretically should be easier to obtain. While it is true that there are various aromatic chemicals which benefit greatly by being prepared in a highly purified state, there are other chemicals which would best benefit if they were left alone. The traces of impurities which you are able to detect with infrared, gas chromatography, and other machines, are very often those very elements which give the chemicals their raison d'etre. The manufacture of pure chemicals in very many cases simply means the manufacture of chemicals whose utility to the perfumer has been greatly diminished. Sometime we hear the argument that by manufacturing pure chemicals the perfumer can better control his product. While this may hold true in many cases, there are just as many instances when I would like to ask—What good are pure chemicals if they give neither life nor color to the perfumer's creation? Until such time as we know what the impurities are, and the role they play, purity of itself should never be a criteria to the perfumer.

Summary

In summary, I would like to point out that unfortunately the purchase of raw materials and the control of finished perfume compounds, either manufactured or purchased, too often has fallen to the lot of the chemist. Because he is able to show management figures and curves to back up his findings, he has slowly but surely usurped the function of the perfumer in determining what is and what is not acceptable. To those companies who use perfumery raw materials and compounds, and specifically to those companies who have no perfumers on their staff but depend mainly upon physical and chemical constants, I give a word of warning: The materials which you are buying are bought because of their odor characteristics. There is no machine which is more sensitive to odor differences than the perfumer's nose. There is no machine that can tell you with certainty and without lengthy and costly analysis that an odor is off. However a perfumer's nose can give you this answer almost immediately. The perfume industry has been built to its present stage of development by the reliance of management upon the perfumer's nose. Where would artists like Matisse, Ruebens, or daVinci be if they were told that they could not use certain colors because they did not meet physical or chemical specifications? A perfumer is an artist and his success depends upon the odors he selects. Don't try to impose artificial restraints upon his creativity. Instead, let the chemist utilize these wonderful instruments to give the perfumer new odorant materials, broadening the spectrum of odors, and so enabling the creative artist to extend his horizon. Let the chemists investigate the trace impurities found in chemicals and essential oils which are so vital to their odors. What are these impurities and what contribution do they make in the final odor? Instrumental analysis can be of great aid to the perfumer in helping to determine the origin of various raw materials. I am sure the chemists and perfumers should find here a fruitful field for investigation. We have yet to see any extensive studies correlating chemical and physical characteristics of raw materials and their odors. Here in particular the perfumer and chemist would do well to work together. Let us use these machines with intelligence and discrimination, realizing their limitations, and always bearing in mind that the reason for the product you use is odor, and the only way to detect odor is with your nose.

Tertiary Alcohols

(Continued from page 32)



Consequently, diethyl ether is used at least in stoichiometric proportions, even in processes which are conducted in other solvents such as dibutyl ether, methyl butyl ether, or hydrocarbons such as heptane or benzene. While these solvents are less potent solvents by far than diethyl ether, they permit higher reaction temperatures, which are desired in some cases. They have the additional advantage of being less hazardous in handling than diethyl ether. A disadvantage of these solvents is that they have to be used in larger quantities than diethyl ether, due to the poorer solubility of Grignard reagents in them. Generally, these reactions applying a substitute solvent for diethyl ether proceed sluggishly, particularly when hydrocarbons are used. To make use of the superior qualities of diethyl ether, Grignard reagents can be prepared in the conventional way in ether solution. After completion of the reaction, the diethyl ether is distilled off and replaced by adding simultaneously the desired replacement solvent.

The reactivity of halides with magnesium follows the usual order. Iodides are the most reactive, followed by the bromides and chlorides. Iodides are applied only in special cases, for example, where greatly enhanced reactivity is desired. Bromides are usually preferred in the laboratory and for small scale production. They have the following advantages:

1. Their reactivity is greater than that of chlorides.
2. Bromides and their corresponding Grignard reagents are more soluble in ether and in other solvents than the two other halides and their Grignard reagents.

A serious disadvantage of bromides is their generally higher prices compared with those of the chlorides.

The latter property of bromides elevates the chlorides, whenever possible, to the preferred reactant in large scale production. In addition, chlorides are less prone to undergo the previously mentioned Wurtz-type condensation than the bromides and iodides. This holds particularly true in the case of benzyl halides and allylic halides.

Vinyl halides did not seem to lend themselves to the formation of Grignard reagents until Normant (33) reacted vinyl bromide with magnesium in tetrahydrofuran, 2-methyl-tetrahydrofuran or tetrahydropyran solution and Ramsden et al. (34) obtained excellent yields in the reaction of vinyl chlorides with magnesium in these solvents.

The preparation of Grignard reagents and the Grignard reaction are best carried out in a nitrogen atmosphere, well protected from moisture. The Grignard reaction is generally conducted under gentle reflex, regulated by cooling and the rate of the interaction of the Grignard reagent with the other functional component.

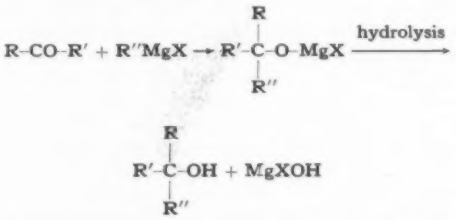
The last step in the Grignard reaction is the decomposition of the reaction mass (magnesium complex) to liberate the desired reaction product. This is accomplished by pouring the reaction mass on ice and adding ammonium chloride or dilute sulfuric or hydrochloric acid to it. When a mineral acid is used, the last trace has to be carefully eliminated, because even minute amounts can cause dehydration of the alcohol during rectification by vacuum distillation.

In large scale production the recovery of diethyl ether, for reuse, becomes an economical necessity. Before decomposition of the magnesium complex, the diethyl ether is replaced by a nonwater-miscible solvent such as a hydrocarbon or a higher boiling ether. Thus the diethyl ether is distilled off and at the same time the replacement solvent (in a sufficiently large proportion) is added to the reaction mass.

For the preparation of a tertiary alcohol, a Grignard reagent will be reacted with one of the following functional components:

1. a ketone,
2. an ester of a carboxylic acid,
3. an ester of a carboxylic acid with a dimagnesium halide (di-Grignard reagent) to give a cyclic tertiary alcohol,
4. an organic carbonate,
5. a carboxylic acid, acid halide or acid anhydride,
6. and oxidation of a Grignard reagent.

1. The interaction of a Grignard reagent with a ketone proceeds according to:



The three radicals can be the same or different alkyl or aryl groups. The best yields in this reaction are obtained if the three radicals are identical and not branched. The yields, under favorable conditions, are between 60-85% of the theory, in spite of side reactions such as the formation of secondary alcohols by the reduction of the ketone, enolyzation of the ketone and side-condensations.

This reaction is of great importance to our industry, as it is used for the preparation of widely used products. **To be continued.**

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Antiperspirant Testing — A Comparison of Two Methods

E. W. DALEY*

The development of methods for testing antiperspirant action has been a problem which has challenged the imagination of many investigators during the past few years, and a survey of the literature on the subject shows that considerable ingenuity has frequently been directed toward devising techniques for this purpose. Both *in vitro* and *in vivo* methods have been described, including, among the former, albumen precipitation (1) and measurements of ion transfer across treated membranes (2), and in the latter case procedures for visualizing sweat patterns or collecting perspiration in the axilla and on other surfaces of the body (3, 4, 5).

Since the axilla is the area of principal concern when antiperspirants are being used, it is only natural that considerable attention has been given to the development of a reliable test procedure for measuring perspiration output at this site. The gravimetric method of Fredell and Read (6, 7) has become quite well-known and has been suggested (8) as a standard procedure for the measurement of antiperspirant action. The method does have some disadvantages, however, and it is the purpose of this paper to describe a different, and in many respects more convenient, method which can be used as an alternative to the method of Fredell and Read. This different method involves measurements made on the backs of human subjects, and this paper will compare results obtained by this procedure with those obtained in the axilla.

Description of the Two Methods

The principal difference between the two methods is the way in which the perspiration output is measured. In the gravimetric method used for measurements in the axilla, tared Webril pads about four inches square are placed under each arm after a sweat-induction period of thirty to forty minutes. In all of the work reported in this paper thermal stimulation of sweating was used. The subjects are exposed to an environment of heat and high humidity; 90°F. and a relative humidity of 60% or more is convenient for the rapid stimulation of perspiration. The pads, placed so that the center is at the center of the axiliary vault, are left in place for a given period, usually from ten to twenty minutes. It is preferable to make two ten minute collections rather than one of twenty minutes; this gives one a better check on the consistency of the results. The amount of perspiration produced is determined by reweighing the pads after the sweat period. The amounts of perspiration produced in the right and left axillae are usually not the same, but a given subject will have a rather consistent ratio of output between the two. Most persons perspire more heavily on the right side. The normal ratio must be determined for each subject by making several control runs before any treatment is applied. If an effective antiperspirant is then applied to one arm, the ratio of output is altered, and the reduction in sweating produced by the antiperspirant can be calculated from the formula:

$$\% \text{ reduction} = 100 - \frac{\text{Antiperspirant test ratio}}{\text{Average untreated ratio}} \times 100$$

In the back test the measurement is one of area rather than weight. Test sites on the subjects' back are treated with antiperspirants, and then, when a reading is desired, an indicating cream is applied to the treated regions and adjacent areas. The cream contains sodium carbonate, which has been finely ground in a ball mill, and phenolphthalein dispersed in an anhydrous base. As droplets of perspiration appear on the skin they dissolve a bit of the sodium carbonate, and the alkaline solution which results is colored a dark red by the action of the phenolphthalein indicator. The sweat pattern thus is easily visible, with each red spot representing one droplet of sweat. A typical pattern around one treated area is shown in Figure 1. By comparing the number of drops in a treated area with the number in an adjacent untreated area the antiperspirant effect of the treatment can be obtained.

As compared with the underarm method, testing on the backs of the subjects has several advantages. Testing on the back is much quicker than testing in the axilla, and less mechanical manipulation is involved. Testing of the products can begin straightway without the necessity of first determining control ratios for the subjects. There is no need to ask the subjects to refrain from the normal use of antiperspirants. Most important as a time-saving factor, however, is the fact that several materials can be tested simultaneously on the back, while only one at a time can be handled in the axilla. (It is recognized that a direct comparison of two materials is possible in the axillary method, but only at the expense of foregoing the measurement of absolute perspiration reduction.) It has been found convenient to test six or more materials simultaneously on the back, using test areas approximately 2.5 by 3 inches in size. This feature of the back test method affords great flexibility in the statistical design of experiments which is not possible when the materials must be tested singly in the axilla. Furthermore, it is possible to include a system of internal controls which facilitates the comparison of results obtained with different panels or at different times. When it is desired to test a number of products on a given group of subjects using the axillary method, a "recovery time" of a week or more must be allotted between each product in order that the axilla can return to "normal" before the next treatment is applied. Since this is unnecessary in the back method, the saving in time involved in running through a series of products becomes really impressive. Allowing a week between each product series, which is almost a bare minimum of recovery time, and allowing

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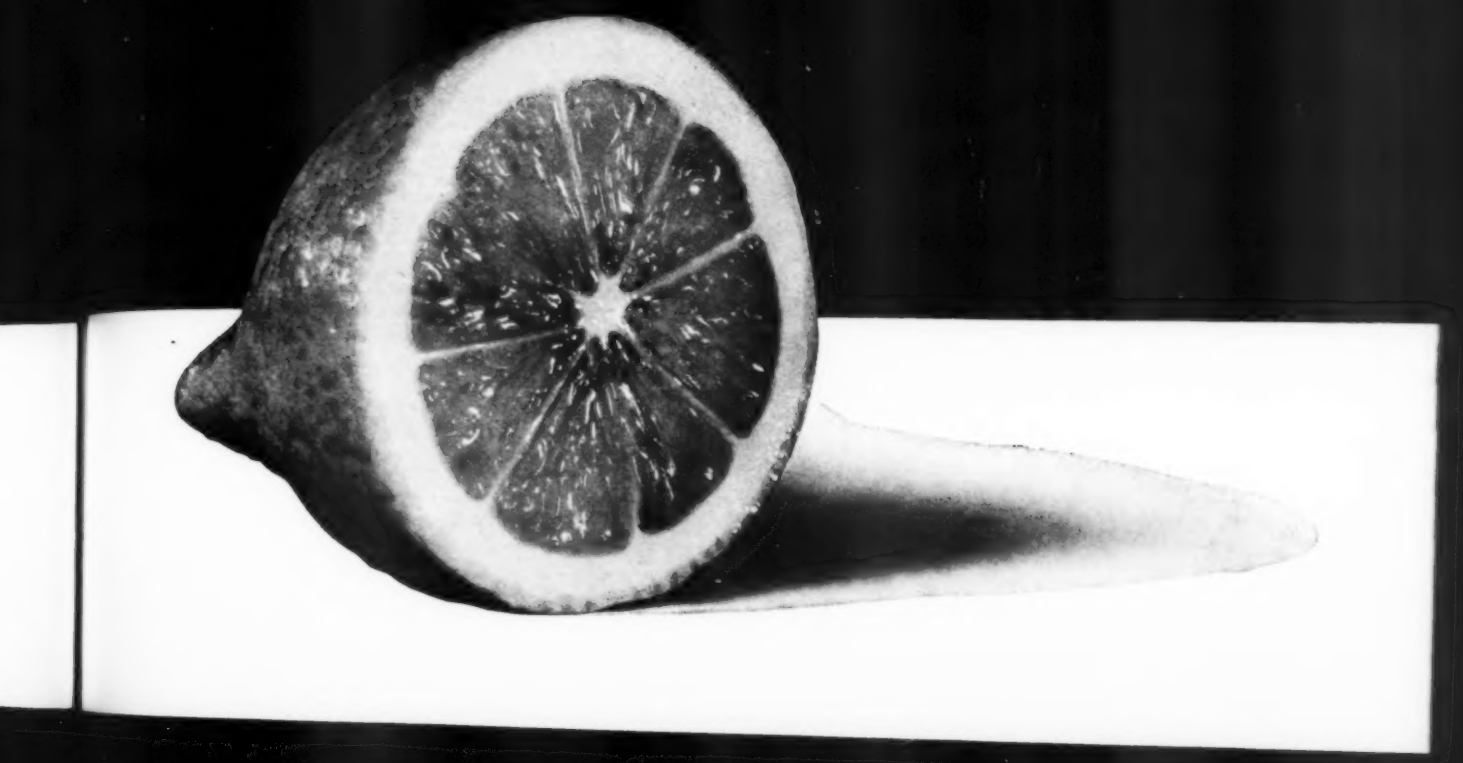


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Note further details and suggestions from our data sheet.

a week to establish control ratios, it would take twelve weeks to test six different products on a given panel of subjects using the axilla as the test site. The same amount of data can be collected for those products and subjects in only one week using the back method.

It is obvious that only eccrine perspiration is involved in the back test procedure, while the underarm method encounters both eccrine and apocrine secretion. With respect to the control of excessive underarm moisture, however, the apocrine secretion is of little importance, since it is far exceeded in volume by the eccrine perspiration. The effect of the apocrine glands is therefore likely to be a rather minor factor in underarm test results.

The underarm method measures the *volume* of perspiration produced, since weight, that parameter actually measured, is directly proportional to volume. In the back test the measurement is essentially one of *area*. Volume, the quantity in which we are ultimately interested, must be assumed to be directly proportional to area in interpreting the results of tests made on the back.

Some Points on Technique

A few observations about technique may be in order. In underarm work it has been noticed that axillary sweating is less when a subject is leaning back against the back of a chair than when he is sitting upright. Also, it has been found that unilateral pressure produced by leaning against the arm of a chair or against the edge of a table strikingly affects the symmetry of sweating. The side on which the pressure is exerted sweats much less, while the opposite side sweats much more. Since much of our work with both methods has involved repeated daily applications, the accurate relocation of test sites on the back has been important. The test materials therefore are applied to carefully measured locations on the back. In many cases features such as prominent moles are of considerable help in relocating the test areas, and measurements frequently are keyed to such individual features. Our experience with cut-out templates for locating test sites has been generally unsatisfactory, as such templates tend to interfere with the even distribution and rubbing in of cream-type products. It might be noted that in order to get maximum effectiveness from creams it is very important that they be rubbed in thoroughly. Saturated cotton pads have been found useful in the application of liquid products. In testing commercial deodorants packed in applicator-type packages the intended mode of application has been followed.

Regardless of which method is used careful technique is necessary in order to obtain reliable results. The pads used in the underarm method must be thoroughly dry before the initial weighing, and kept so until use. The pads may be dried by being heated at 100°C. for at least twelve hours, being placed in well-sealed containers for weighing. Weighing must be done to the nearest milligram. The pads must be kept in close contact with the axillae during the collection period, and re-weighed promptly after collection. In the back test method the indicator cream should contain a generous amount of sodium carbonate; at least 25%. Much less phenolphthalein is required; 0.5% is sufficient. The indicator cream should be spread thinly yet evenly over the back. The untreated areas chosen for comparison should be selected so that the amount of perspiration in these areas is not significantly different from that to be expected in the treated areas if no effect were obtained. In many individuals there is a markedly greater sweat output along the backbone than in the areas to either side; obviously in such cases the center of the back is not a suitable area for comparison with test areas near the sides. As a matter of fact, we avoid making any use of the center of the back. The test sites for a given product are distributed over all possible locations within a panel of subjects in order to minimize the effect of different sweating rates at various spots on the back. Grading is done by position only, without knowledge of which product is in which location. If there is any doubt as to where the test sites are located on a subject they can be found by measurement, as described above.

Results of Tests

In all of the underarm work and back testing discussed here a program of repeated daily applications was used. Test materials were applied once per day on four successive days. The reason for this is that the ultimate effectiveness of many antiperspirant materials is not obtained with the first application, as was shown in the paper on zirconium oxychloride as an antiperspirant presented before the Toilet Goods Association two years ago (9). The results of the first day's application have been considered as being the least meaningful in terms of representing the ultimate effectiveness of a material, so the stimulation of sweating and reading of the results has been dispensed with on the first day. First-day results with the axillary method are usually quite low, while first day results on the back have for some unknown reason tended to be quite erratic. The back test has shown much better consistency after the third and fourth application. On the second, third and fourth days measurements of efficacy have been made approximately one hour after application of the test products. In some cases readings of the effectiveness have been delayed as long as twenty-four hours after application, but all of the data in this paper had the one hour timing. Thus far nothing has been seen at twenty-four hours which would suggest any important revisions in the conclusions reached on the basis of one-hour data.

Figure 2 shows comparative average results with an antiperspirant cream containing zirconium oxychloride and aluminum chlorhydroxide as the active ingredients. The solid line shows the average reduction in perspiration observed in underarm tests on 35 women. The average reduction on the fourth day of application was 40%. The dotted line shows the average results obtained in testing on the backs of 23 men. The general trend of the averages is higher in this case, but not significantly so, as will be seen below. On the fourth day the average reduction was 50%. It should be kept in mind that in this test, as in all of the others reported in this paper, the test materials were applied to the subjects once a day for each of the days of the test, usually four. It will be noticed that the underarm data reported in this paper were obtained in tests with women, while all of the back test data reported here were obtained with male subjects. Each method has been tried with both sexes; some underarm data on the zirconium oxychloride formulation tested on men were reported in a previous paper. No significant differences in response to antiperspirants have been noticed between men and women.

Table I shows the results of a number of tests of commercial antiperspirant products. The panels are smaller, being from seven to nine members in size. Cream A contains the zirconium-aluminum combination discussed above; indeed this is the same product used in the work shown in Figure 2. The data for Cream A in the following Table I are from typical small panel tests of the product. The other products in Table I all contain aluminum salts as the active ingredients; one of the creams and the lotion contain the widely-used aluminum chlorhydroxide, while the other two creams contain other well-

known aluminum salts. The underarm tests were all carried out on women, while the back tests were made on seven men. In the back test all five of the products were tested simultaneously. These data are for the fourth day of application, and the average reduction by each method for each product is shown with the 95% confidence limit.

TABLE I

	Average % Reduction in Perspiration, 4th Day	
	Back Method	Underarm Method
Cream A	49±12*	41±21
Cream B	19±16	18±24
Cream C	23±13	22±19
Cream D	29±10	22±7
Lotion E	24±20	27±15

*The second figure is the 95% confidence limit on the average.

Precision of the Methods

Table I gives some indication of the degree of precision to be expected from either of these methods. It must be admitted that neither method is a very precise procedure for measuring antiperspirant efficacy, but the two methods are about equal in this respect, and the author is not aware of any better method. Figure 3 shows 95% confidence bands placed on the data in Figure 2. Table II compares figures for tests with zirconium-aluminum formulations with panels which can be grouped into three different sizes.

TABLE II

Product	No. of Subjects	Average % Reduction Day 2	Day 3	Day 4
Cream A				
Back	23	42±12*	39±10	50±9
Underarm	35	35±7	34±7	40±6
Cream A				
Back	7	57±23	49±21	49±12
Underarm	9	34±13	32±9	41±21
Solution of Actives from Cream A				
Back	5	61±34	56±15	48±28
Underarm	6	44±20	50±26	54±23

*The second figure is the 95% confidence limit on the average.

In general it has been found that either method will give 95% confidence limit "spreads" of about ±15 to ±25 when the average effectiveness of the product is about 40% and the panel includes seven to nine subjects. Increasing the panel size improves the precision, but not in any marked fashion. In both methods doubling the panel size generally improves the precision by about a third. In both methods, however, there is a general trend toward increased precision when dealing with the most effective antiperspirant materials. This is not surprising, because the most effective materials generally have the most consistent effect in going from one individual to another. It appears that far and away the greatest cause of the "spread" in the confidence limits, and hence the relatively low degree of precision in the average values, arises not from difficulties in measurement, but simply from the rather marked differences in individual responses to antiperspirants. Precision could be improved by selecting panelists with about equal response to a given antiperspirant, or possibly by using panelists who have about equal rates of sweating, but this would not be realistic when one is trying to develop products for use by a large cross-section of the population. Efforts have been made to keep these panels as representative as possible, within the limits imposed by their size and the ready availability of subjects. The work discussed in this paper has shown that the variation in effect with different materials in going from one person to another can be quite erratic. It is impossible to predict with certainty, on the basis of panel averages, just what effect a given set of materials will have on a given individual who has not been tested, although the panel averages do give an indication of the *average* effect to be expected with a *group* of people.

Keeping in mind that neither of the methods under discussion is a sharp tool for determining average efficacy, the correlation between the two methods is quite good. This may be seen by inspection of the comparative data already presented. Admittedly, however, on occasion results have been obtained which did not agree so closely. One commercial liquid, tested in the axilla among a panel of nine women, gave an average reduction of 27% after the fourth day's application, but when tested on the backs of nine men gave an average reduction of 47% on the fourth day. The active ingredient was a familiar one, so, in comparison with other data on this ingredient, it appears unlikely that this difference is any evidence of a fundamentally different response among men than among women. Additional testing may bring these averages into closer agreement. Certainly with either technique the best way to increase one's confidence in the results is to use as large a panel as possible. Panels of less than eight or nine subjects will in most cases give only a rather vague idea of the level of efficacy obtainable with a given material; larger panels of twenty or more subjects are definitely desirable. This can be seen from the results in Table II, where the confidence limits on the data from the five-member panel are so broad as to give only a rough idea of the effect of the product. For example, there is really little reason to suppose that the product was actually most effective on the second day and that the efficacy was reduced on succeeding days.

The work done thus far has covered cream, lotion, and liquid formulations representing all of the more usual antiperspirant actives. Rather close agreement between the results from the two methods has been obtained in all but a few cases. One example of a disagreement has been mentioned, but inadequate number of subjects may well have been a factor in that case. The most significant further exception deserves notice. This is a cream formulation which gives very good results on the back which can not be duplicated in the axilla. A representative back test with this material, on nine men, gave averages of 89%, 84% and 82% reduction on the second, third and fourth days respectively. These are typical of many tests made with this material over a period of several years. Underarm work with this material among 24 women, however, gave averages of 21%, 23%, and 22% on these three days. It is believed that this discrepancy is caused by a surface coating of the skin as the cream is applied, with consequent mechanical blocking of the sweat ducts. On the back this coating remains quite undisturbed, at least for the duration of each day's testing, while in the axilla the coating is subject to flexure and abrasion during arm movements, and tends to be destroyed. This effect has been seen thus far only with some cream-type products. If a formulation is suspected of this sort of activity one might test the cream base, without the active ingredients, on the back. If pronounced antiperspirant effect remains, the likelihood of maintaining this degree of efficacy in the axilla is much reduced.

It has been noticed in some instances during back tests that such sweat droplets as do appear in test areas treated with such a cream tend to be noticeably smaller than usual. This is usually not the case with other products, where the sweat droplets in the treated area are of normal size, but are simply reduced in number per unit area. These observations also suggest the possibility of skin coating, with partial blocking of the duct openings, while the type of antiperspirant activity seen more commonly in these tests would appear to be a more deep-seated action below the surface of the skin in which the predominant type of activity would be an "all or nothing" inhibition of individual sweat glands. It is worth noting that tests of strictly *deodorant*-type products, which are not intended as antiperspirants, have consistently shown no antiperspirant effect, either on the back or in the axilla.

Figure 4 shows the distribution of the perspiration reductions for each subject about the average reduction for the total panel in the test series illustrated by Figures 2 and 3. This work was concerned with a cream containing zirconium oxychloride and aluminum chlorhydroxide, the underarm portion of the testing being carried out among 35 women, the back testing being done on 23 men. It will be seen in Figure 4 that on the fourth day, forexample, in the underarm test 26% of the members of the panel had reductions within 5 percentage points of the overall average for the panel, 51% of the panel were within 10 points of the average, and 80% were within 20 points. The corresponding figures for the back test are 17% within 5 points, 56% within 10 points, and 74% within 20 points. Thus the distribution of results within a panel is similar in both methods. The ranges of the data are also very comparable in the two methods.

As an indication of the consistency of effect which is obtained with a given subject, Table III shows the results of repeated tests of the zirconium oxychloride-aluminum chlorhydroxide cream. In each case the reduction shown is that achieved on the fourth day of a back test. The results were obtained in test series run periodically during the past year, with all seasons represented, and the values are given in the order obtained, with the earliest data at the tops of the columns.

TABLE III
Results from Repeated Tests on the Same Subjects

Subject 1	Subject 2	Subject 3	Subject 4
20% red.	80% red.	50% red.	60% red.
50	70	70	60
50	30	70	40
20	80	70	80
30	40	70	80
70	60	45	55
65			
60			

While some variation in effect exists, the efficacy of this material is fairly consistent on a given subject. There is no tendency toward either an increase or decrease in effectiveness over a year's time.

Safety Considerations

Any testing program dealing with antiperspirants must make adequate provision for establishing the safety of such materials. A detailed discussion of methods for checking the safety of antiperspirants (or any other cosmetic to be applied to the skin) will not be attempted here, but there is one point which is appropriate to this paper in view of the mention of zirconium-containing formulations. This concerns the so-called axillary granuloma problem which has received considerable attention in recent months (10, 11, 12, 13). The cases reported in the literature have involved sodium zirconium lactate (sodium hydrogen trilactatozirconylate, $Na_2H_2ZrO(C_3H_4O_3)_3$), which is quite far removed chemically from zirconium oxychloride ($ZrOCl_2$). Notice that in sodium zirconium lactate the zirconium atom is in the anionic portion of the molecule, while of course the zirconium occurs in the cation in zirconium oxychloride. The tests for the safety of the zirconium oxychloride formulation indicated no problem such as granuloma formation, and the test results have been confirmed in two and a half years of gradually expanding test marketing of the product. In this time the product has been used by at least 500,000 people, a sizeable proportion of them having used it regularly for many months. The total number of irritation complaints of any type whatsoever received during this time is four. It is our understanding that this is considerably below the average level of irritation comments experienced by the industry. Significantly, none of these four cases appeared to be of a granulomatous nature.

Summary

The back test method is a more rapid and convenient procedure for measuring antiperspirant efficacy than the axillary method and gives the same range of average results with equal accuracy. An exception to this conclusion which must be cited involves certain cream-type products which apparently form a surface coating on the skin, resulting in large reductions of perspiration on the back which can not be duplicated in the axilla. Neither the back test method nor the gravimetric method used in the axilla gives very good precision with small panels, but the precision is about the same in each method, and there appears to be no other procedure which is more reliable. The major reason for the lack of precision appears to be the variation in response of individuals to given antiperspirant materials; it is necessary, therefore, to use fairly sizable panels in order to gain a realistic idea of the average effectiveness of a product. The saving in time and the greater flexibility of experimental design possible with the back method make it an interesting and useful alternative to underarm testing. It is particularly suited to screening materials for antiperspirant effect.

Acknowledgment

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Design Guide For Better Detergents

R. D. STAYNER*

The recent transistion from soaps to synthetic detergents has one particularly remarkable aspect. Of all the many chemical types of surfactants available commercially, only a select few have found their way into the home laundry market, the major outlet for the detergent industry.

There are three reasons why these few types have dominated the industry:

1. They meet required performance standards.
2. They can be manufactured commercially in large volume.
3. Their cost is stabilized at a relatively low level.

This is past history.. In the future it is likely a few select types still will be favored in the large volume market, probably for the same three reasons. But it seems certain detergents of the future will have improved performance properties compared with today's materials. Our expanding background of technical information on detergents suggests improvements are inevitable.

In designing a more effective cotton detergent, knowledge of the roles played by surfactants and builders in the cleaning process is an invaluable assistant. Familiarity with the physico-chemical principles involved in detergency is also helpful. An analysis of the important roles and principles serves as the basis for this suggested design guide for better detergents. Rationalizing from the analysis, requirements of a cotton detergent for achieving maximum cleaning effectiveness are proposed.

The first requirement of an idealized cotton detergent is related to surface active properties such as wetting and emulsifying ability. Due to the presence of oily or way materials in most soils and on cotton fabric their surfaces tend to be hydrophobic in character. As a result, the interfacial tension is high between these solid surfaces and water. Pure water fails to wet the surfaces readily.

An important function of surfactants is to lower interfacial tension so that the solution can wet the surfaces and penetrate to the areas of the soil-fabric interfaces. Thus, wetting is important because it brings the detergent solution into close contact with soil and fabric.

Good cotton detergents contain surfactants which are at least moderately effective wetting agents. However, surfactants which are the best wetting agents are not superior in detergency effectiveness. For this reason it is difficult to evaluate the importance of wetting in the cleaning process, although it is apparent at least a moderate degree of wetting activity is necessary. Therefore, the first requirement of a cotton detergent for achieving maximum effectiveness is that it contain a surfactant having at least a moderate degree of wetting activity.

Several other important functions of surfactants in detergency are a result of their tendency to absorb on soil and fabric surfaces. The hydrocarbon chain of surfactants becomes adsorbed preferentially on hydrophobic surafaces. By virtue of its polar group, the surfactant converts soil surfaces from hydrophobic to hydrophilic in character. This creates a new surface on the soil which is far more compatible with a water phase. Soil is now more easily removed from the fabric, broken up, dispersed and emulsified in the wash solution.

Although it is the polar group of the surfactant which makes the soil surface hydrophilic, its operability is governed by the tendency of the surfactant hydrocarbon chain to adsorb on the soil surface. Thus, high efficiency correlates with a strong hydrophobic character of the hydrocarbon chain. Directionally, the larger the hydrocarbon chain of the surfactant, the stronger the hydrophobic character. This suggests that, for maximum cleaning effectiveness, a surfactant should have as large a hydrocarbon chain as possible being limited in size only by the range of hydrophobic/hydrophilic balance required for a moderate degree of wetting and emulifying ability. This is the second requirement of a superior cotton detergent.

An important function of anionic surfactants in detergency is their ability to alter electrical effects. This property also depends on adsorption of a surfactant on soil and fabric surfaces. Its effect is the result of the phenomenon that, "surfaces bearing the same electrical charge repel each other."

An electrical surface charge on finely divided soil is the result of either: (a) ionization of surface components, or (b) the tendency of surfaces to preferentially adsorb ions from the medium. For example, ionization of fatty acids present in some soils results in a negatively charged carboxyl ion and a positively charged hydrogen ion. Being part of the fatty acid molecule, the carboxyl ion is firmly attacted to the surface. However, the hydrogen ion tends to wander away from the immediate area of the carboxyl ion. As a consequence, there is a difference in electrical potential between the immovable layer of carboxyl ions attached to the surface and the movable hydrogen ions in the body of the liquid medium. This results in a negatively charged surface. Therefore, any other similarly charged surface in the immediate vicinity would tend to be repelled. This electro-negative surface charge is called the zeta patential. It is believed to be a very important factor in cleaning.

Most fabrics and finely divided soils are electronegatively charged or have a negative zeta potential. Therefore, their surfaces tend to repel each other. When soils stick to fabric it is because these electrical repelling forces are too weak to overcome other forces which stabilize the soil-fabric bond. A major role of anionic surfactants in the soil removal process is to adsorb on soil and fabric surfaces and increase the negative zeta potential, strengthening the forces of repulsion between

(Continued on page 71)

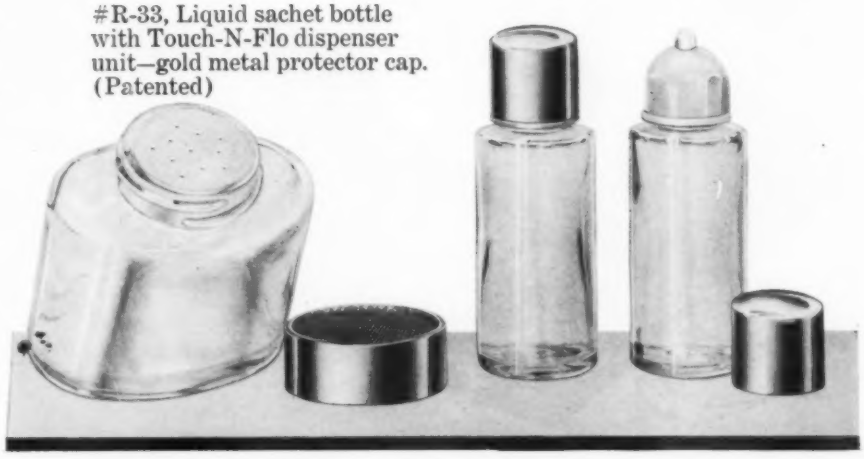
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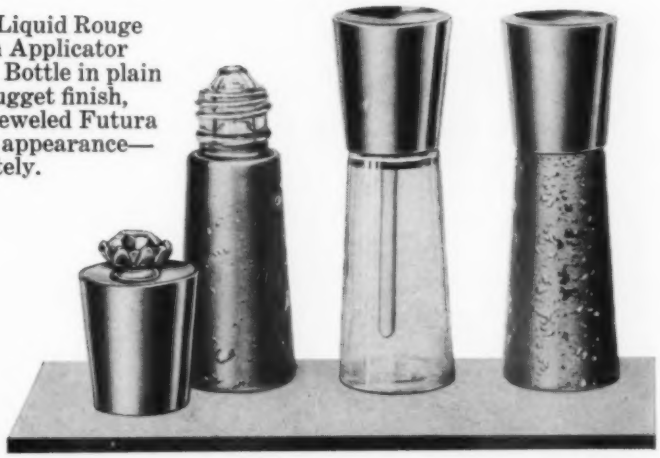






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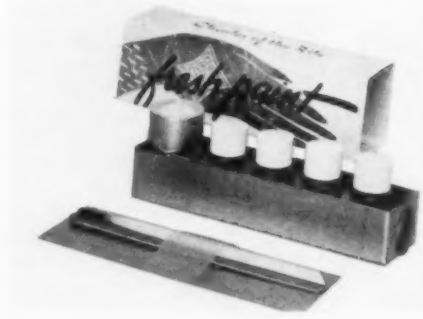
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1.

CHARLES OF THE RITZ—1

This nail polish kit by Charles of the Ritz, called "Fresh Paint," is divided into three miniature bottles of polish designed to provide a constant supply of fresh lacquer. Also included is a long-handled plastic brush of special polished bristles which regulate the flow of polish, and a liquid brush cleaner. The kit pulls out from its container box like a drawer and keeps the bottles spill-proof. It comes in six pure shades and four lustre shades, and costs $2.



2.

BARBARA GOULD—2

Barbara Gould announces ten new lipstick shades seven of which were imported from Paris and reflect the European trend towards lighter brighter lipstick colors. These lipsticks contain a new "Lustre Last" formulation designed to soften, smooth and protect the lips as it colors. The lipsticks, in golden cases, retail for $1.25 each.

NORTHAM WARREN—3

Cutex features its new "The Pink from Paris" shade in a specially designed counter display unit which holds both polish and lipstick. Decorating the display is a full-color reproduction from the national ad used to promote this shade. The display measures 8½" by 15" and presents 33 pieces of merchandise.



3.



4.



5.

BONNE BELL—4

This new compact and lipstick combination by Bonne Bell is sky-blue decorated with gold flowers and monogram. The compact is plastic and contains "Bonne Blend," a combination of foundation and face powder available in seven shades. It sells for $1.50. The lipstick is available in two new shades and sells for $1.25.

GERMAINE MONTEIL—5

"Supersec Flo-Top," a new direct-application deodorant by Germaine Monteil, is packaged in a plastic container of ivory and brown which eliminates all waste in dispensing. The container is lightweight and safe for travel. It sells for $1.50 and is suggested for both men and women.



6.

MAX FACTOR—6

Two new skin preparations, "Skin Clear Medicated Cleanser" and "Skin Clear Medicated Foam," to be sold individually and also combined into a "Skin Clear" kit are announced by Max Factor. The cleanser comes in a glass bottle, and the foam in an aerosol container to keep it fresh and germ free. Both products are packaged in cerulean blue and white and contain a free skin care booklet describing application. They sell for $1.00 and $1.95 respectively.

KINGS MEN—7

Slanted for Father's Day sales, this display by Kings Men makes use of three decorative stack tables with bright colored tops of white, black and orange. The tables will hold a complete array of Kings Men individual items and gift sets, and are easily arranged to provide varied display patterns.



7.

1959 Set-up Paper Box Competition



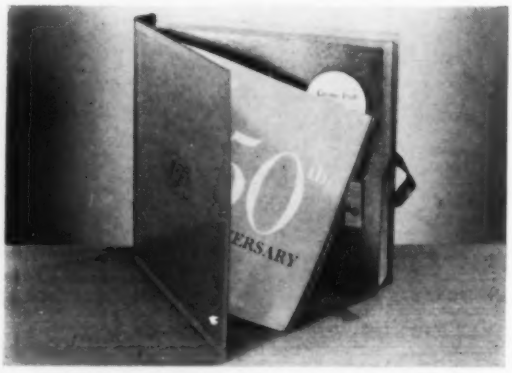
First award in rectangular cosmetic boxes went to Park & Tilford for this container manufactured by Karl Voss Corp. and designed by Jack Mohr. Closed, the box portrays a sylvan scene carrying out the "Woody Glen" theme. Opened, the bottle is revealed mirrored three times by hinged sides covered with copper. A die cuttray slips over the neck of the bottle to completely immobilize it in shipment.

Ninety-four awards were made in the Ninth Annual Set-Up Paper Box Promotional Competition, sponsored by the National Paper Box Manufacturers Association. All entries were on display during the Association's Annual Meeting at the Sheraton Hotel in Philadelphia, May 20-23. Selections were made from the equivalent of over 2,400 entries by a seven man panel of packaging, merchandising and design experts.



These boxes have a tailored striped wrap which prominently features the manufacturer's trademark. Die-cut base inserts provide firm support for the glass bottled toiletries, while plastic bottles are displayed through a cutaway box. They won second award in soap and men's toiletries for the Congress Paper Box Company and House of Men.

General Beauty Products and Karl Voss Corp. won second award in rectangular cosmetic boxes for this eight-sided blue satin container with padded top and gold printing. The pedestal-like base is composed of an inverted, white satin-covered tray set in blue satin. The box was designed by Norman Sinclair.



Second award in design and execution and honorable mention in promotional boxes went to Specialty Paper Box Co. and Max Factor for this gold and blue set-up style box, which emphasizes the "golden anniversary" theme used in relating an entire line of Max Factor products.





Honorable mention in surface design and execution went to Haviland Laboratories and Karl Voss Corp. for this oval perfume box in light gray accentuated by the trade name and a decorative design embossed in white. The interior platform of the box is covered in gold foil and has a cutaway collar that not only holds the bottle in place but also shows as much of the bottle design as possible.



Johnson & Johnson and George H. Snyder, Inc. won honorable mention in display boxes and honorable mention in rectangular cosmetic boxes with this gift box. This package marks the first application of expanded polystyrene to the packaging of toiletries. The tray can also be used as a nursery tray since provision has been made in moulding to support bottles in an upright position. Full telescope lid provides maximum area for artwork and makes a stronger double-wall box.



First award in round and oval cosmetic boxes went to Simonetta of Rome, Inc. and F. N. Burt Co., Inc. for this perfume box. The Roman column design announces an Italian product. The lid is banded in heavily embossed paper, simulating a fluted column not only in appearance but to the touch as well. With the lid removed the unusual black bottle is displayed as on a gold and white pedestal. Closed, the tapered bottle is held firmly by both the base tray and die-cut lid receptacle. The designer is Rudy Urias.



The Seaforth Division of Prince Matchabelli, Inc. and Newark Paper Box Co. won first award in soap and men's toiletries with this "barber shop quartette" box in Victorian style which aims to suggest the era of the manly moustache. Costs of this box were held to a strict budget by die-cutting the cover supports and bottle separators out of the three-sided back panel; as a result less acetate was required to fabricate the transparent cover.



Second award in transparent boxes went to Prince Matchabelli and the Warner Brothers Co. for this "perfume honors" box. Here the novel tray serves both as a functional unit in holding the bottles in place and as a decorative backdrop for the acetate cover design.

TECHNICAL LITERATURE

Editors are constantly beseiged with mail announcing the availability of technical literature prepared to meet the needs of any and all readers. We know that such a boast is impossible. What follows are reports of literature which we feel were the best among the arrivals of recent weeks.

Automatic De-Sludgers. 8-page booklet describing continuous centrifuges for purifying chemicals and pharmaceuticals. Various models are described, showing the flow of the feed, sludge and purified streams. Available from Centrico, Inc.

F. B. Reconstituted Oil Bergamot. 4-page brochure with suggested uses and physical and chemical characteristics of this synthetically produced oil. Fritzsche Bros., Inc.

Sodium Formate. A low molecular weight, water soluble crystalline powder for pH control is the subject of a new 8-page booklet published by Heyden Chemical Divisions, Heyden Newport Chemical Corp.

How To Pack It. 32-page fully illustrated book published recently by Hinde & Dauch, Sandusky, Ohio. Packaging idea book, utilizing corrugated material, with emphasis upon individual products.

VCA Catalog Sheet. The new "Valvu" board, a three-dimensional "catalog" of aerosol valves and other components is described in a catalog sheet prepared by Valve Corporation of America, manufacturers of aerosol valve parts and assemblies.

Public Relations Aids. A variety of professional public relations aids is offered in "The Man Behind the Medicines," a brochure now available from Pfizer Laboratories, and J. B. Roerig and Co., divisions of Chas. Pfizer & Co. The aids are designed to assist pharmacists in telling the story of their profession and stimulation of interest in pharmacy as a career.

Industrial Deodorants and Aerosol Fragrances. Alpine Aromatics Inc., Metuchen, N. J., announces a new publication of an illustrated brochure detailing technical recommendations on deodorants and fragrances.

Price Catalog. Dodge and Olcott offers its new price catalog of essential oils, aromatic chemicals and specialties, flavor and perfume bases, certified colors and dry soluble seasonings. Prices, brief descriptions and general information are included.

Acetal Resin. Delrin is the name of the new thermoplastic material announced in a recent 4-page du Pont bulletin. Ideas for aerosol packaging for such products as perfume, colognes, hair formulations, deodorants and toothpastes are discussed.

Liquid Handling Equipment. A new bulletin has been published by the Ertel Engineering Corp., Kingston, N. Y., describing their varied line of liquid handling equipment. It is illustrated and shows the many types of Ertel filter sheets and filtering equipment. Bottle fillers, pumps, and mixers for the chemical, drug, cosmetic, food, and wine industries are described.

Advanced Techniques in Automatic Systems. Brochure which describes systems of sorting, counting, inventory control, and selective separation of mixed products on conveyors and related equipment is available from Atronic Products Inc., Bala-Cynwyd, Penn.

Testing of Glass Volumetric Apparatus. National Bureau of Standards Circular 602, by J. C. Hughes, 14 pages, issued April 1, 1959, 20 cents. Supersedes Circular 434. In order to encourage high quality in the manufacture and accuracy in the use of precision glass apparatus for measuring volume, the National Bureau of Standards has formulated the specifications contained in this literature. Methods of calibrating and using such equipment are described, as well as the tests performed by the bureau and procedures for submitting instruments for tests.

Equipment—Forty-eight page LaPine Apparatus Review 10 features the new line of Freas ovens, incubators, sterilizers, and special purpose cabinets in a 32-page section.

A Collectochrom®, an apparatus which makes continuous chromatic separations, is one of the new pieces of laboratory equipment introduced in this issue.



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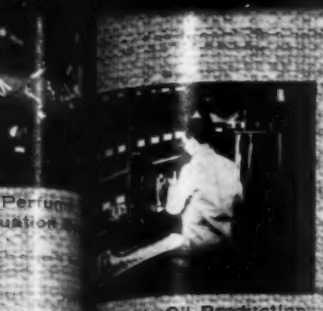
Chemical Engineering



Sales



Perfume Evaluation





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TECHNICAL ABSTRACTS*

MEASUREMENT OF SKIN MOISTURE BY POTENTIOMETRIC METHODS

by Isaiah S. Botwinick, Director Research Testing Laboratories, New York, N. Y.

In an attempt to measure the moisture content of the skin quickly and easily a potentiometric method has been devised. The method measures the amount of moisture in the keratin and intra-dermal layers of the skin. A specific amount of electric current is introduced into various layers of skin using an original circuit. There is a potential difference or drop between the electrodes which difference is proportional to the resistance between the electrodes or inversely proportional to the moisture present in the skin layer being tested.

Measurements were made of the surface, intra-keratin, and intra-dermal layers using specially designed electrodes. Measurements were made under different test conditions and the variables effecting the measurements are given:

1. Dry, skin, vaselined skin, acetone-washed skin, lotion coated skin, etc.
2. Surface area used—palm, dorsal hand, dorsal forearm, antecubital fossa.
3. Humidity, temperature.

Problems encountered and the manner in which they were solved are discussed, plus limitations of the method and suggestions for improvement.

A method is discussed which measures the therapeutic effectiveness of test lotions and creams to impart emmoliency, suppleness, etc. to the skin using the rates of hydration and dehydration as measured by the described apparatus.

DEGERMING ACTIVITY OF TOILET BARS—INTERPRETATION OF BACTERIOLOGICAL DATA FROM HAND WASHING TESTS

by J. J. Travers, A. C. Rohloff, E. L. Ambye, and L. J. Vinson, Research & Development Division—Lever Brothers Company

The *in vitro* antibacterial effectiveness of deodorant toilet bars is measured with a fair degree of accuracy under controlled testing conditions. Following the demonstration of satisfactory activity in simple laboratory tests the bars are assessed for degerming activity under actual usage conditions. The method in general use today is some modification of the Price Serial Basin Wash procedure. This consists essentially of determining the number of bacteria on the hands of subjects before and after the use of a product containing a germicide and calculating the percent reduction.

Occasionally, laboratories may disagree on the relative degerming efficiency of soaps as determined in the Serial Basin Wash Test. The major difficulty stems from the fluctuations in cutaneous bacterial counts of subjects' hands which can vary widely because of environmental, physiological and personal considerations. In view of these virtually uncontrollable factors the need for a realistic interpretation of serial basin wash data becomes paramount.

The various traditional methods of interpretating cutaneous count data are discussed such as percent reductions determined on the basis of arithmetic mean values, geometric mean values and the arbitrary assigning of a single high initial value for all subjects. These treatments have been found to be in agreement for very effective germicidal bars but fail in the assessment of fair to good degerming products in subjects varying in initial cutaneous counts. An alternative method of analysis is reported which allows the realistic evaluation of a deodorant bar on small panels of subjects where the magnitude of the initial counts is not a factor. Essentially, the method is a regression analysis of logarithm of final count on logarithm of initial count. This analysis shows that percent reduction is not independent of initial count. The percent reduction is calculated from the regression line for a standard initial count representing the mean of the population. This approach gives unbiased and reproducible estimates of the degerming efficiencies of poor, intermediate and good deodorant bars.

*Presented at the Semi-Annual Technical Meeting, Society of Cosmetic Chemists, May 7, 1959.

MECHANISMS OF ENZYME ACTION*

by D. E. Koshland, Jr., Brookhaven National Laboratory, Upton, N. Y.

This paper will present a summary of the properties of enzymes, their mechanism of action, and some of the work in the author's laboratory regarding the active site of enzymes. All enzymes are proteins and therefore subject to the same denaturing agents as proteins. Heat, pH changes, urea concentrations and sale concentrations, can all affect the shape of a protein molecule and, hence, its catalytic activity. It has been found, however, that these protein molecules have considerable flexibility and that therefore they may frequently snap back to their original shape even after fairly serious stresses. Moreover, it has been found that large portions of the protein molecule can be completely eliminated without damaging enzyme action and other large portions can be modified in ways that will alter, without completely eliminating, enzyme action. These facts, together with a comparison of the relative sizes of enzyme and substrate, lead to the conclusion that there is a small area called the active site which contains the main residue of enzyme activity.

Some of the properties of the active site have been delineated either by labeling with radio-active tracers, by changing conditions such as pH or by removing large portions of the protein molecule to obtain a smaller fragment still containing enzymatic activity. The fact that a small fragment may still retain activity is further supported by the theoretical studies using physical organic chemistry. While we are a long way from understanding the exact nature of enzymic catalysis, the growing literature indicates that enzymes act by a combination of known chemical principles rather than by any new magical formula. The evidence in support of these conclusions will be discussed and some of the ramifications in regard to application to practical problems will be mentioned.

* Research carried out at Brookhaven National Laboratory under the auspices of the U. S. Atomic Energy Commission.

(*Continued on page 56*)

TONALID

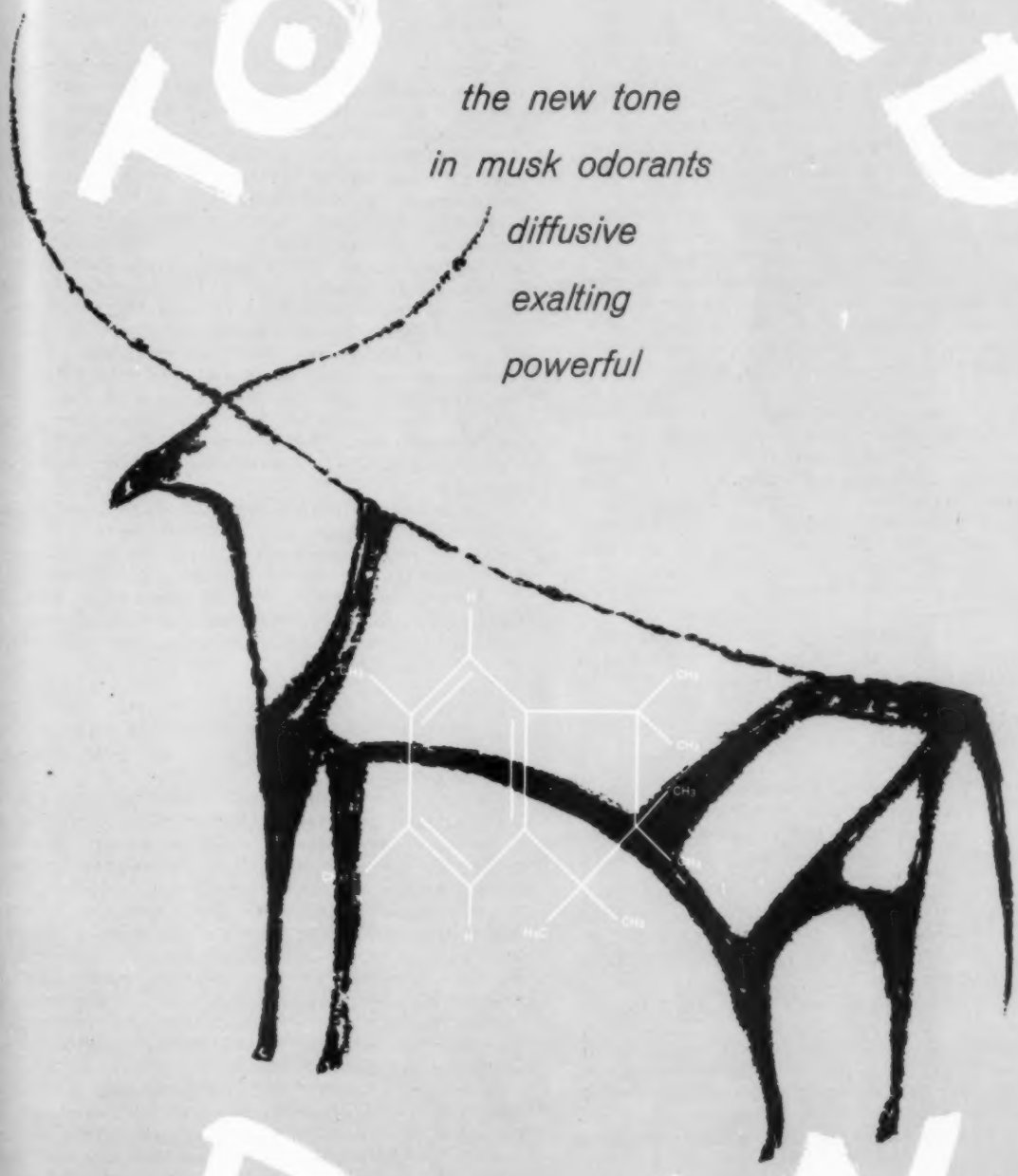
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Continued from page 54

LONG TERM TISSUE CULTURE AS AN INSTRUMENT IN QUANTITATIVE RESEARCH

by Wilton R. Earle, Laboratory of Biology, National Cancer Institute

Of recent years rapid developments in the technology of growing various types of mammalian tissue cells in culture outside the body has made the use of such cultures valuable in many fields of study. Established cell strains can, in many instances, be originated from single isolated cells, and the cells of such established strains can be maintained in rapid proliferation either on a solid substrate, such as a sheet of glass, or freely suspended as isolated cells in a rapidly agitated nutrient culture fluid. For quantitative studies large numbers of cultures of high accuracy of replicacy can be easily prepared and various phases of the nutrition and metabolism of their cells accurately followed. Such cultures can now be used for determining chemotherapeutic activity, for growth of viruses, for determination of toxicity or growth stimulation of specific compounds. Divergent cell transformation in morphology, in nutritional behavior, and in enzyme patterns have been produced and are being studied. Transformation of normal to cancer cells in culture have been repeatedly accomplished and the mechanism of change is under study.

In our own laboratory at least 3 established cell strains can be maintained in rapid proliferation in entirely chemically defined protein free media; one has already been so maintained more than 4 years to date. These include such diverse cell types as mouse connective tissue fibroblasts, liver epithelium and human adult epithelium. The behavior of the living cells can be followed visually or photographically; by microcinematography rates and manner to cell migration, cell proliferation, and cell necrosis can be studied.

Whereas a few years ago cultures containing a few milligrams wet weight of cells were considered luxuriant, already certain cell types can be rapidly grown in cultures which contain multiple gram lots. General principles involved in growth of such massive cultures are such that even much larger cultures could readily be grown when desired.

Use of these technological advances already greatly advances the long-term tissue culture in its applications in precision research and emphasizes its even further potentialities of development in the future.

THE EFFECT OF SORBIC ACID AND OTHER PRESERVATIVES ON ORGANISM GROWTH IN TYPICAL NON-IONIC EMULSIFIED COMMERCIAL COSMETICS

by R. D. Charles and Phyllis J. Carter, Atlas Powder Company

Preservation of non-ionic cosmetic products is occasionally a difficult problem. This has prompted several investigators to study the use of various preservatives in non-ionic surfactant systems. This work has led to somewhat controversial and perhaps misleading conclusions. As a practical approach to the problem, the Atlas Powder Co., Product Development Dept. Laboratory has obtained from four nationally known cosmetic houses a series of typical non-ionic cosmetic emulsions prepared with the preservatives normally used and a second series prepared with sorbic acid, inoculated them with a bacterium and eight molds, and observed them for evidences of organism growth after a three months' storage period. The tests show that many of the commonly used preservatives are effective in non-ionic cosmetics. Where failure was noted, as well as in cases where the usual preservatives worked well, sorbic acid afforded good protection.

APPLICATION OF GAS CHROMATOGRAPHY AND MASS SPECTROMETRY TO THE DETERMINATION OF ODOR

by Charles Merritt, Jr., Pioneering Research Division, Quartermaster Research and Engineering Center, Natick, Mass.

The detection and identification of the volatile components which constitute an odor have long been a challenge to the chemist. Modern instrumental methods of analysis have now greatly increased the chemists' ability to identify and characterize odors. The tremendous advances which have been made in the characterization of odor by chemical or physical means have accompanied the advances in the processing and preserving of foodstuffs where odor is one of the factors which play a very important part in the complex of sensations responsible for flavor. The methods of gas chromatography and mass spectrometry have proven particularly useful in the identification of volatile components isolated from fruits, vegetables, meat and coffee. The techniques which have been developed to identify the chemical components of food aromas may be extended to permit characterization of the chemicals responsible for the odors arising from other sources such as flowers, plants, insect secretions, and air pollutants. These techniques have particular significance for the cosmetic chemist in the study of perfumes.

The techniques of gas chromatographic and mass spectrometic analysis will be briefly described and some examples of the application of these techniques to the determination of odor components arising from vegetables, coffee and other food products as well as the identification of the odor components isolated from an insect secretion and a characteristic sweet smelling flower will be given.

CORROSION TESTING OF AEROSOL PRODUCTS

by Morris J. Root and Merlin J. Maury G. Barr & Company

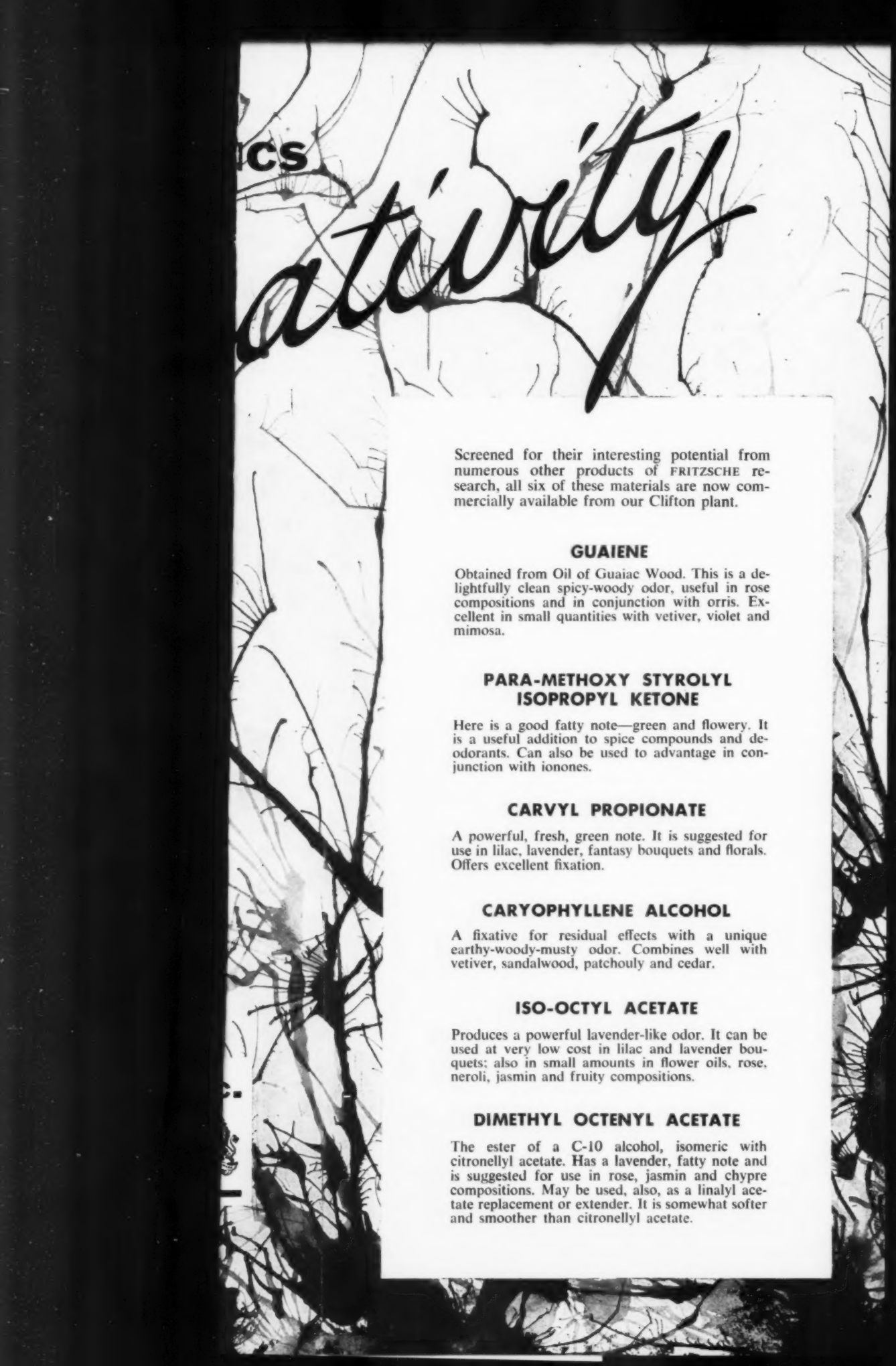
The large number of aerosol cosmetic products which are marketed in metal containers makes corrosion a question of utmost importance. Every known means of testing for corrosion is now used in order to evaluate metal container suitability for a given product.

The oldest and most frequently used method of corsion testing is the test pack wherein a number of units are packaged, stored at room temperatures and higher for various periods of time, and then opened and inspected. An additional procedure which is now used in conjunction with the test pack is to analyze the product for metallic contamination which has resulted from erosion of the container.

A new and additional tool now being used is the determination of electrochemical potentials between metallic components of the container, such as iron, solder and tin, in the product under test. Not only can the potential be obtained, but the galvanic current generated can be measured. These measurements can be extremely useful in the interpretation of findings on test pack results. Such explanations of what is actually occurring in the container can guide the selection of inhibitors and changes that are to be made in the containers.

Corrosion in aerosol containers is of such complex nature that every tool available must be used to come to intelligent conclusions in a minimum of time.


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GUAIENE

Obtained from Oil of Guaiac Wood. This is a delightfully clean spicy-woody odor, useful in rose compositions and in conjunction with orris. Excellent in small quantities with vetiver, violet and mimosa.

PARA-METHOXY STYROLYL ISOPROPYL KETONE

Here is a good fatty note—green and flowery. It is a useful addition to spice compounds and deodorants. Can also be used to advantage in conjunction with ionones.

CARVYL PROPIONATE

A powerful, fresh, green note. It is suggested for use in lilac, lavender, fantasy bouquets and florals. Offers excellent fixation.

CARYOPHYLLENE ALCOHOL

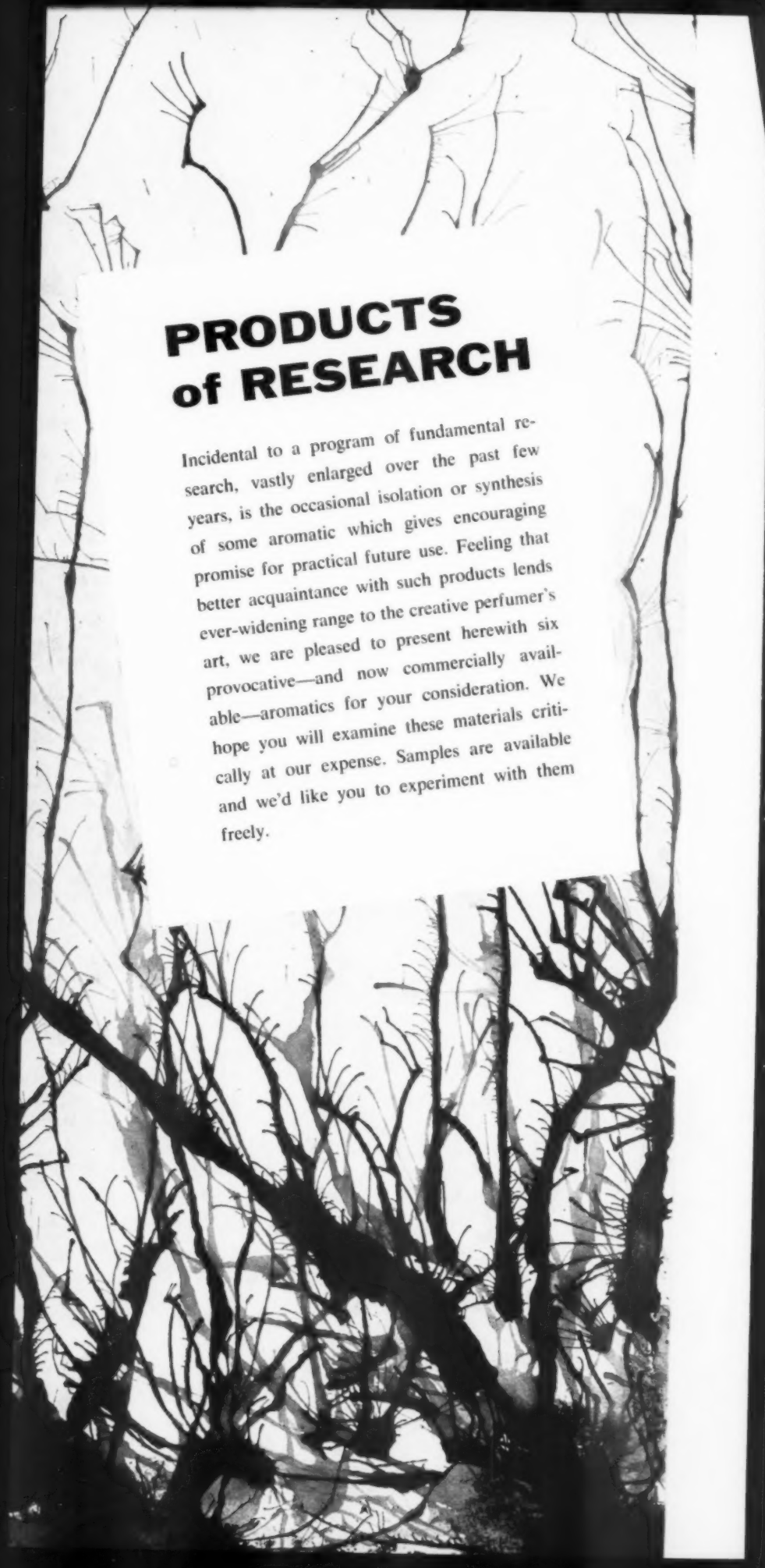
A fixative for residual effects with a unique earthy-woody-musty odor. Combines well with vetiver, sandalwood, patchouly and cedar.

ISO-OCTYL ACETATE

Produces a powerful lavender-like odor. It can be used at very low cost in lilac and lavender bouquets; also in small amounts in flower oils, rose, neroli, jasmin and fruity compositions.

DIMETHYL OCTENYL ACETATE

The ester of a C-10 alcohol, isomeric with citronellyl acetate. Has a lavender, fatty note and is suggested for use in rose, jasmin and chypre compositions. May be used, also, as a linalyl acetate replacement or extender. It is somewhat softer and smoother than citronellyl acetate.



PRODUCTS of RESEARCH

Incidental to a program of fundamental research, vastly enlarged over the past few years, is the occasional isolation or synthesis of some aromatic which gives encouraging promise for practical future use. Feeling that better acquaintance with such products lends ever-widening range to the creative perfumer's art, we are pleased to present herewith six provocative—and now commercially available—aromatics for your consideration. We hope you will examine these materials critically at our expense. Samples are available and we'd like you to experiment with them freely.

linalool

by FRITZSCHE

THIS valuable aromatic is made in our own plant by a unique and carefully controlled process. The resulting material is one of extremely high purity and finest odor— considerations of no little consequence to the creative perfumer. Entirely lacking in the undesirable by-notes that sometimes occur in the less pure product, LINALOOL by FRITZSCHE may be used with complete confidence in bouquets and specialties, and in various synthetic flower oil compounds for extracts, toilet waters and colognes. It is widely employed in perfumes for creams, powders, lipsticks and soaps. Its soft, sweet odor is reminiscent of lily of the valley.

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News and Events

TGA Has 24th Annual Convention

"The Power of an Idea" was the theme of the opening session of the Toilet Goods Association's 24th annual convention, held at the Waldorf-Astoria on May 12-14. Well-known personalities who discussed this theme before the session included Gypsy Rose Lee, author and actress; Hildegarde, theater entertainer; and Dore Schary, author and theatrical producer. New officers of the Association were also elected, several awards were presented, and nine technical papers were read during the three-day meetings.

Steve Mayham, executive vice-president of TGA, in an address to all members discussed the proposed delisting of coal-tar dyes necessary for lip-stick production. Mr. Mayham warned that, "a veritable Pandora's box of difficulties will face the Secretary [of the Department of Health, Education and Welfare] when he deprives 50 million American women of the lipsticks to which they have been accustomed and which his Department itself asserts have never done any harm to any user." Mr. Mayham went on to say, "I am extremely hopeful that a satisfactory bill will be enacted by the Congress this year but I assure you . . . we are not going to endorse bad law under pressure."

Dr. Paul G. I. Lauffer, research director on Northam Warren Corp. was presented the CIBS annual award. This award is made to the author of the paper published in the Proceedings of the Scientific Section of the TGA of the proceeding year which in the judgment of the editorial Board is the most meritorious. Dr. Lauffer's paper "Some New Keys to Cosmetic Chemistry—1958" is a critical literature review convering some 422 technical articles. The award was made by John Duncan, Eastern Regional Sales Manager, Continental Can Company—Hazel Atlas Grass Division, who is president of CIBS.

Also presented were the annual Charles S. Welch Memorial Awards, for the six best essays submitted on the general topic "Motivation of Unplanned Purchases of Toilet Goods in Drug Stores." The work was done as a part of the regular curriculum at the Graduate School of Business Administration at New York University. The prizes were awarded by Mrs. Estee Lauder of Estee Lauder Cosmetics Company to Douglas Martin (first prize); Dorothy Hull (second prize) and G. B. Chandless (third prize). Honorable Mentions went to Patrick Devaney, David Schoen, and Milton Loeb.

Charles S. Oestreich, President of the Lander Company, was elected a Director of TGA for a 3-year term at the election of officers and directors. J. S. Wiedhopf, chairman of the board, Roure-Dupont, Inc., was elected a director representing the Associate membership, for a 1-year term. All other officers and directors were re-elected. They include President Arthur E. Johnston, Colgate-Palmolive Company; and Vice-Presidents Jean Despres, Coty, Inc.; Oscar Kolin, Helena Rubinstein, Inc.; J. I. Poses, D'Orsay Sales Company; and D. H. Williams, Sterling Drug, Inc.

Also re-elected were Philip C. Smith, Yardley of London, Inc., Treasurer; William F. Denney, Jr., Frances Denney, Secretary; and Directors Paul Bremer, Christian Dior; Charles F. Junod, Pacquin, Inc.; George L. Schultz, Shulton, Inc.; Benson Storfer, Parfums Corday, Inc.; Norton S. Walbridge, Beauty Conselors, Inc.; and Edward P. Morrish, Firmenich, Inc.

Dr. Guenther Returns From South American Trip

After three strenuous months in the interior of South American investigating the most recent essential oil developments in Argentina, Brazil and Peru, Dr. Ernest Guenther, Vice President and Technical Director of Fritzche Brothers, Inc., is back at New York headquarters.

Included in his Argentine venture were the peppermint regions of Mendoza and the extensive lemongrass and citronella acreages in the Provinces of Corrientes and Misiones. In Brazil he travelled through the sassafras region in the Itajaí Valley (State of Santa Catarina) and through the State of Paraná where *Mentha arvensis* oil and menthol are produced. In the State of São Paulo, he made a survey of the production of citrus, eucalyptus, lemongrass, citronella and palmarosa oils.

The most interesting part of his trip was a survey of bois de rose production in Manaus. Dr. Guenther made this trip by private boat and canoe far into the interior via tributaries of the Amazon River. A flight from Manaus to Iquitos in Peru and from there to Lima, with a stop in Cusco and a visit to the old Inca ruins in Machu Picchu, completed Dr. Guenther's itinerary in his current series of South American investigations.

He gathered much photographic material, a considerable footage of colored motion pictures and hundreds of still pictures, much of which will be used in connection with his future lectures and literary presentations throughout the country.

Perfume Factory Inaugurated

The New Factory of the Industrial Perfumes (Private), Ltd. Bombay, a Tata Roure-Dupont France enterprise, was recently inaugurated at the Tata Oil Mills Compound, Sewri.

The Company, which was registered in May 1957, is the result of collaboration between the Tata Oil Mills Co., Ltd. and Roure-Bertrand Fils & Justin Dupont, France.

Mr. Naval H. Tata, who welcomed the guests, stressed the need for making India self-sufficient in its requirements of perfumes particularly in view of the foreign exchange difficulties.

New Market Report on Permanent and Temporary Hair Coloring Preparations

Redbook Magazine has just released a new 30-page industry and market report on "Permanent and Temporary Hair Coloring Preparations."

The report, in three sections, covers the history and growth of the industry. It summarizes data on hair coloring usage, consumer brand preferences, buying habits, and a five-year picture of magazine advertising expenditures by individual brands.

Part I of the report traces the development of the home hair coloring industry from its small beginnings in the early 1930's to its present position as a $35 million-a-year industry. The report discusses the marketing of permanent hair colorings, "color restorers," temporary hair colorings and shampoos, aerosol sprays, hair crayons, sticks and other types of "make-up." Part II lists advertising expenditures in consumer magazines over a five year period. All companies spending $1000 or more in any year since 1953 are listed. Part III is a compilation of surveys on consumer use, brand preferences and buying habits.

Francois Goby Returns

Francois Goby, director of Tombarel Freres, Grasse, France, has returned to France following his second visit to the United States this Spring to confer with Orthus Gogarty, president, and other executives of the Americal company, Tombarel Products Corp.

CIBS Award To Dr. Lauffer



John M. Duncan, Eastern Regional Sales Manager, Continental Can Company-Hazel Atlas Glass Division, President of CIBS, presents annual CIBS award to Dr. Paul G. I. Lauffer, Research Director of Northam Warren Corporation, at annual TGA convention May 14.

Detergents Up, Soaps Down First Quarter

Sales of soaps and synthetic detergents in the first quarter 1959 totalled 975,294,000 pounds valued at $249,417,000 according to reports from sixty-two members of the Association of American Soap & Glycerine Producers, Inc., who constitute a substantial proportion of the industry. Tonnage advanced 1% over the first quarter 1958, but declined 2% from the fourth quarter. Dollar sales were under both the first and last quarters of 1958 by about 2%.

Synthetic detergent sales amounted to 732,896,000 pounds and $179,144,000 up 5% in pounds and in dollars from the first quarter 1958. Solid synthetic detergents totalled 618,400,000 pounds valued at $135,389,000, a 3% increase in pounds and a 1% rise in dollars compared to the first three months of 1958. Liquid synthetic detergent sales were 114,496,000 pounds with a value of $43,755,000. Tonnage increased 14%, and value rose 18%, in comparison to the first quarter 1958.

Soap sales, totalling 242,398,000 pounds and $70,273,000, slipped 10% in pounds and 2% in dollars from sales reported for the first quarter 1958.

New Service Association Set Up By Women in Cosmetic Industry

Inspired by the idea that the cosmetic industry should undertake various worthy projects of a service nature, a group of women have founded the "Cosmetic Industry Service Association." A number of such projects have been proposed and will be assigned shortly to committees for further exploration. Definitely on the agenda, however, are plans for a scholarship fund, and a program for providing special training to young women interested in a future in the cosmetic industry.

The following officers of the "Cosmetic Industry Service Association" have been elected: Gertrude Savoie of Compagnie Parento, President; Mimi Baillif of Cinderella International Corporation, Vice President; Genevieve Campis of Coutin Associates Inc., Treasurer; and Ronnie Mazur of Anco Label and Tape Corporation, Secretary.

Membership is open to women holding responsible positions not only in the cosmetic industry itself, but also in all allied industries.

Presents Awards



Mrs. Estee Lauder presents Charles S. Welch Awards at annual TGA convention, May 13. Left to right: Douglas Martin, 1st prize; Mrs. Lauder, Dorothy Hull, 2nd prize and G. B. Chandless, 3rd prize. Three other honorable mention prizes were given. All were students at New York University Graduate School of Business Administration.

Rothman Gives The Medical Viewpoint Of Drugs In Cosmetics

The unprecedented special meeting of the New York Chapter of the Society of Cosmetic Chemists which was entirely and magnanimously sponsored by the Geigy Chemical Corporation at their plant in Ardsley, New York, on May 6, 1959, was climaxed by a paper given by Dr. Stephen Rothman on the medical viewpoint of the use of drugs in cosmetics.

The evening, a well-planned one, thanks to Mr. Zussman and his associates of Geigy Chemical Corp., began with cocktails and a dinner followed. A tour of the research laboratories was included, and it is doubtful that any one of the 300 attending failed to take advantage of viewing the wonderful modern facilities.

In his paper, Dr. Stephen Rothman, Professor and Head of the Section of Dermatology of the Department of Medicine of the University of Chicago, claimed,

"All definitions of the word 'cosmetics' imply materials and procedures used for beautifying appearance and promoting attractiveness. The concept has been expanded to include not only visual attractiveness but also aiming at pleasing touch and olfactory impressions. Such purposes can be pursued by strictly non-medical measures, such as covering, dyeing and other 'make up' procedures, by soothing rough surfaces with emollients, counteracting unpleasant odors by perfumes, absorbing excess fat and sweat secretions with inert powders, etc. Such measures are part of the ancient art of beautifying. The art becomes a science when the causes of particular deficiencies of appearance and the action mechanisms of cosmetic procedures are being studied. This has been done with great success by modern cosmetic chemists who have utilized the progress in the knowledge of cutaneous physiology as well as of chemistry, physics and physical chemistry." "Beyond that, however," he went on, "improvement of appearance very often is in the domain of the physician. Dermatological cosmetology is a substantial part of dermatology. Correct diagnosis and treatment of acne, loss of hair, excessive

(*Continued on Page 64*)



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(*Continued from Page 62*)

hairiness, pigment anomalies, pathologically excessive oiliness and perspiration and removal of unsightly lesions for cosmetic purposes require general medical and specialistic dermatological knowledge and skill. They also require thorough familiarity with the action mechanism of drugs, their physiological and pharmocalogical effects and side effects."

"Forensically," he stated, "surgical operations and the prescription of drugs are the privilege and responsibility of the physician. After having made a diagnosis, a good physician will establish the indications for drug administration and will prescribe the required dosage individually. Only a person trained in medicine is in a position to weigh the pro-s and con-s of drug administration both from the patient's and the public health point of view."

Based on this reasoning, Dr. Rothman felt it was "ill-advised to add chemically and pharmacologically active drugs to cosmetic preparations and to sell them across the counter indiscriminately."

The special problems of antibiotics, hormones and vitamins in cosmetics were discussed separately.

In relation to hormones and vitamins he stated, "Medicated cosmetics, of course, have a fixed concentration of the drug with no concern for differences of individual needs. Worse than that, they would not have a limit of absolute dosage. This implies serious danger if the material is able to penetrate the skin. If one will try to avoid this danger by fixing the concentration at an extremely low level the efficacy of the medication will become problematic and may serve only promotional purposes."

With respect to antibiotics, he claimed that those that were not used systemically because of their internal toxicity could very well be used topically but "we must be sure that there was enough data on its sensitization."

Dr. Rothman's paper resulted in lively discussions from the audience which asked for his opinions on various examples of drugs in cosmetics.

CSMA Report Shows Industry Rise

Production of non-food aerosols reached an all-time high of 470 million units in 1958 with an estimated retail value of almost a half billion dollars. This estimated report was given to the pressure-packaging industry May 19th at the 45th Mid-Year Meeting of the Chemical Specialties Manufacturers Association in Chicago. It represented, they were told, a 20 per cent increase over the 1957 performance of the 13-year-old industry.

Hair sprays accounted for about 27 per cent of last year's record-breaking production, topping for the third consecutive year the hundred-odd types of products now available in the self-spraying, push-button packages. Closely grouped for second place among the high-volume products were room deodorants, which make up 15 per cent of the 1958 total, and shaving lather and insect spray, which accounted for 13 and 12 per cent cent, respectively.

Output of tooth paste and dental cream in pressurized packages, reported for the first time, amounted to at least 12.9 million units. Such products first appeared on the U. S. market only a year ago.

The 1958 survey, eighth annual study of aerosol production conducted by the trade association, indicated that largest sales of pressurized products were in the six-ounce, or smaller, size container. Larger, economy-size packages of 16 ounces or more increased in popularity with consumers last year, particularly for such products as spray paint and insecticides.

Dr. Neugebauer Ends Visit

Dr. Herbert Neugebauer, secretary and one of the founders of the Society of Cosmetic Chemists of Germany has returned to Germany after spending four weeks visiting manufacturers of cosmetics in New Work, Chicago, Cleveland, Detroit and other cities. Dr. Neugebauer is chief research chemist for F. Wolff Sohn, Karlsruhe, Germany which has its research laboratories in Baden-Baden.

Cortisone Pioneer Honored

The scientist who achieved the first synthesis of cortisone was honored at the Philadelphia College of Pharmacy and Science, May 6. Dr. Lewis H. Sarett, Director of Synthetic Organic Chemistry at the Merck Sharp and Dohme Research Laboratories, received, that evening, the Rho Chi Honorary Pharmaceutical Society Citation and later delivered the annual Julius W. Sturmer Memorial Lecture. The title of his address was "The Development of Antiinflammatory Steroids."

At a dinner preceding the citation and the lecture, eight outstanding students at the College were inducted into the honorary Society. Members of the faculty, members of Rho Chi, and representatives of the various scientific organizations in the Philadelphia area were present at the dinner to witness the induction ceremonies.

S.C.C. Tech Meeting Award to Dr. Blank

Dr. Irvin H. Blank, eminent dermatologist and biochemist, received the Annual Special Award of the Society of Cosmetic Chemists. The presentation was made at the Special Award luncheon on May 7th at the Hotel Commodore for his work and publications on factors controlling suppleness and flexibility of the skin. Society of Cosmetic Chemists' President, Savery F. Coneybear made the presentation. The works of Dr. Blank were described by Dr. Leon Goldman, Professor of Dermatology at the University of Cincinnati, College of Medicine.

H. J. Amsterdam, President-Elect of the Society of Cosmetic Chemists and Chairman of the Special Award Committee addressed the well-attended luncheon and described the method used by the Society to select the award winner. He also discussed the voluminous work of the Literature Research Committee whose members nominate the several candidates for the award.

The technical meetings, which consisted of seven papers, received excellent attendance. (*See page 54.*) Among the visitors was Dr. Wolfgang Eckardt of the Kleinol Company (a Division of Lever Bros.), Germany.

Fifth Annual School for Advanced Cosmetologists

Southern Illinois University will host the fifth annual School for Advanced Cosmetologists, the first of its kind in the world, from July 19 to August 1.

Classes in hairstyling, permanent waving, the science and art of cosmetology, and haircoloring will be included in the curriculum. The School also will feature speech, semantics, business, and psychology courses designed to help cosmetologists understand and fulfill the wishes and whims of patrons. Every student will participate in hairshaping, make-up, shampoo chemistry, haircoloring and many other demonstrations.

Teen-Age Toiletries Preferences Reported

A survey of a cross-section of teenage girls reveals that 82.9% use hand lotions and creams; 70.3% use liquid shampoos, 54.8% wash their hair more

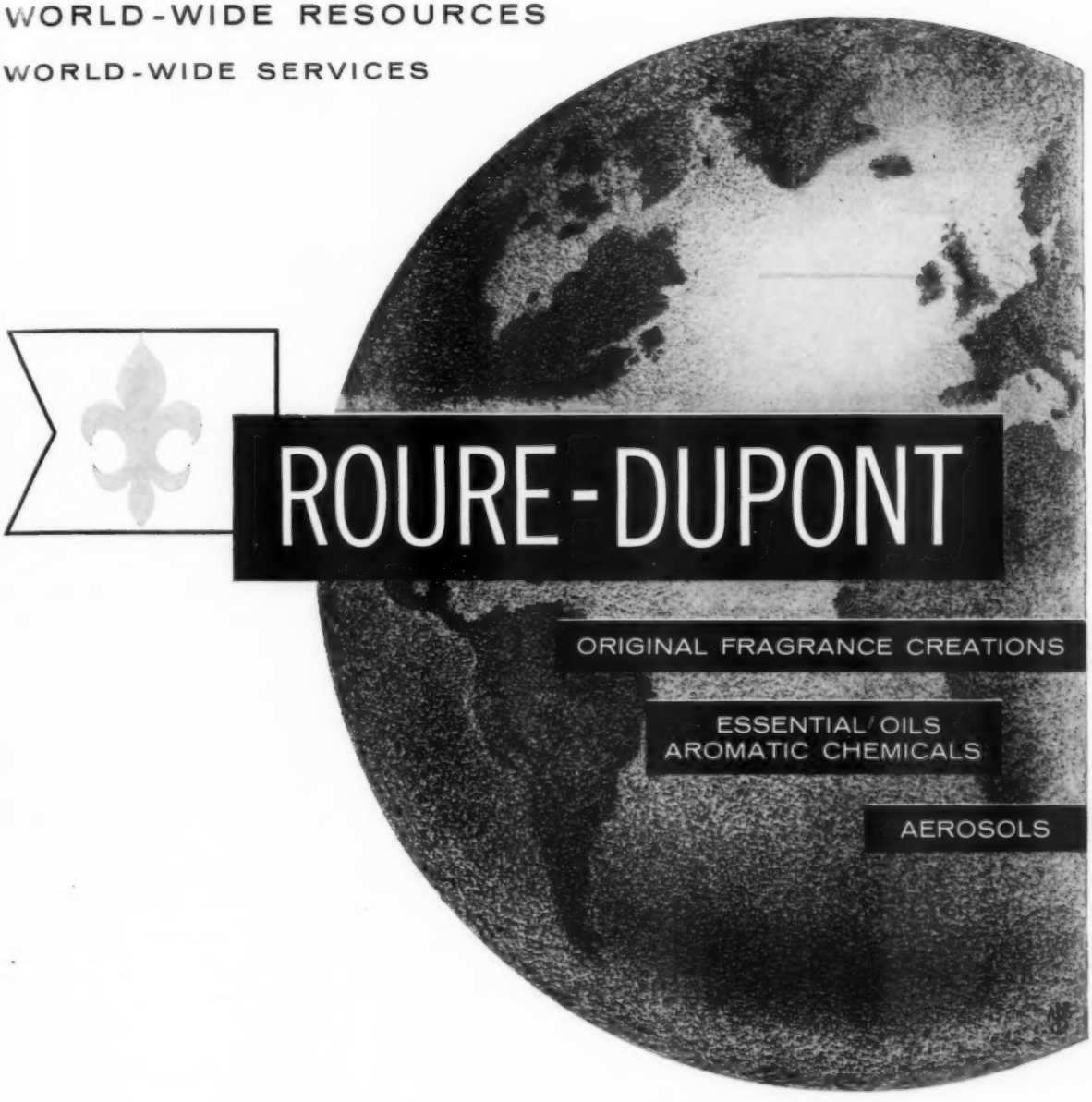
S.C.C. SPEAKERS



The speakers at the Semi-Annual Technical Meeting of the Society of Cosmetic Chemists (l. to r.) Isaiah S. Botwinick, Research Testing Labts.; Charles Merritt, Jr., Quartermaster Research and Engineering Center; J. J. Travers, Lever Brothers Company; R. D. Charles, Atlas Powder Company; Wilton R. Earle, National Cancer Institute; L. D. Apperson, Colgate Palmolive Co. and Program Chairman of the Society; D. E. Koshland, Jr., Brookhaven National Laboratory; and Morris J. Root, George Barr & Company.

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Fred Crowhurst (left), vice president of van Ameringen-Haebler (Canada) Ltd., welcomes Capt. T. Aaldijk of the freighter Prins Willem George Frederik to Toronto. The Captain's ship has just won an exciting race to be the first ocean-going vessel through the new St. Lawrence Seaway to reach Toronto. It carried general cargo from Holland, including a sizeable shipment of fragrance and flavor materials for Mr. Crowhurst's company.

Teen-Age

(Continued from page 64)

than once a week and 99.4% prefer toothpaste to tooth powder, according to a report recently published by *Seventeen* Magazine.

Entitled "The Beauty Habits and Product Preferences of Young Women Under 20, Number II, Part I," this report is the second annual study in a continuing survey conducted by *Seventeen* to determine which toiletries and cosmetics are regularly used by teen-age girls, which product varieties they prefer, and place of purchase. The current report, concerning toiletries, is based on the questionnaires of a cross-section of 1,247 *Seventeen* subscribers representing a range of economic background and geographic location.

The report indicates that most teen-age toiletries purchases are made in drug stores, with food or supermarkets ranking next in popularity. For purchases of bath or facial soaps, however, the preferences are reversed with most soap purchases made in super markets.

Skin care products are widely used by teen-age girls. The report reveals that 53.1% wash their faces with soap and water twice a day and 28.5% more often than that. Medicated soap, face cream and liquid cleanser are preferred for face cleansing and 54.4% of the girls polled also use a medicated cream or lotion.

F.E.M.A. Holds 50th Anniversary

The 50th Annual Convention, "Golden Anniversary", of the Flavoring Extract Manufacturers' Association of the United States was held at the Hotel Roosevelt, New York, on May 11th. President E. N. Heinz, Jr. welcomed all of the members and guests and called upon Mr. Garret F. Meyer, who addressed the convention on "Fifty Years of Service".

Mr. Meyer reviewed some of the highlights of the association during the past fifty years. Reference was made to the fact that of the nine original companies who signed the application for certificate of incorporation of the association fifty years ago, five are active members today, and that not only have these five founding firms been members for fifty continuous years, but they have been over the years active leaders in the affairs of the association.

Mr. Meyer stressed the fact that whereas the problems of today are more challenging and bigger than those of past years, the association, nevertheless, still employs its time-old doctrine of cooperation with the federal and state food control officials in the protection of honest and legitimate business, and the promotion of proper labeling, packaging, and manufacturing practices.

Commissioner Harvey Speaks

John L. Harvey, Deputy Commissioner of the Food and Drug Administration, Department of Health, Education and Welfare, congratulated the association on reaching its Golden Anniversary, and said that in his opinion the organization is a constructive one which has led to cooperation and work with the Food and Drug Administration and its predecessor, the Bureau of Chemistry, in a most distinguished fashion. Commissioner Harvey referred to the Food Additive Act and its many ramifications, and the necessity of all flavoring substances added to foods to be properly qualified under said food additive act as being exempt or non-exempt.

President Heinz, in his annual report, reviewed the activities of the Board of Governors during the past year. Reference was made to the various standing committees of the association, and the efforts of the Chairmen of the respective committees to keep the entire membership continually abreast of developments within the industry.

John S. Hall Reports

John S. Hall, executive secretary, reviewed informative and legislative bulletins issued during the past year to the membership. Reference was made to the fact that forty-five states and Congress were in session during the past year and that 1,380 bills were introduced in Congress and the various state legislatures which in one way or another affected the industry. During the past year the most important bills were revenue measures to increase or supplement the respective state treasuries. Hall stressed that some of the states are desperately in need of additional revenue to maintain their respective state governments and that it has been estimated that during the forthcoming year the various states will require the sum of 31½ billion dollars to cover various state administration expenses, an increase of 1½ billion dollars from last year.

He further added that we have reached an era where no effort is being made to curtail expenditures by our federal, state, county, city and other administrative agencies. We hear a great deal about economizing, he said, but nobody seems to be doing anything about it. The increase in expenditures in the various government agencies reflects upon the cost of doing business, he explained, and therefore there must be a re-evaluation of the cost of doing business not only in this industry but in all industries.

Mr. Hall referred to the recent U.S. Supreme Court decisions, which opened up the flood-gates for states to tax foreign corporations on interstate commerce. He reminded that the Supreme Court, in three important decisions, held that interstate commerce has become so localized within a state that it has the privilege of enjoying the advantages of a local business and therefore is a competitor to local business and ought to pay its own way and not place other local businesses at a competitive disadvantage. He added that whether or not a foreign corporation maintains a local office, warehouse, or stock of goods within a given state, that corporation is subject to state corporation taxes.

In concluding Mr. Hall called attention to the fact that the association was celebrating its Golden Anniversary and that it is with pride and dignity that it can review its past accomplishments and look forward with courage and determination to the future.

(Continued on page 68)

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A partial list of organizations who have ordered extra reprints:

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- Cutter Laboratories
- Sterling-Winthrop Research Institute
- Chemo Puro Manufacturing Corporation
- Old Empire
- Clearing Chemical Laboratories
- Loyola University
- New England College of Pharmacy
- Fries Bros. Inc.
- Airkem, Inc.
- Charles Albert Smith Limited
- The University of Buffalo
- The Kamlet Laboratories
- Toni
- The Procter & Gamble Co.
- Prince Matchabelli, Inc.
- Lehn & Fink Products Corporation
- Vestal Incorporated
- Swift & Co.
- Pharma-Craft Corporation
- N.V. Chemische Fabriek
- R. H. Macy & Co. Inc.
- Atlas Powder Company, Canada, Ltd.
- University of Arkansas
- Hysan Products Co.
- Braun Chemical Co.
- Golden Peacock, Inc.
- Armour And Company
- E. I. DuPont
- Dept. of Health, Education, & Welfare
- State University Of Iowa
- The Hart Products Corp.
- Rockwell Products Co.
- The Dow Chemical Co.
- Aero-Chem Labs.
- Lawrence Richard Bruce Research Labs.
- West Laboratories, Inc.
- Royce Chemical Co.
- J. A. Tumbler Lab.
- Rohm & Haas Company
- Vytone Labs.
- Celanese Corporation Of America
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(Continued from page 66)

Progress on Vanilla Research

On the second business day, Dr. H. P. Burchfield of Boyce Thompson Institute for Plant Research, Inc., gave a summary of progress on vanilla research. Dr. Burchfield stated that during the past four years, a vanilla research program sponsored by the F.E.M.A. and Vanilla Bean Association of America has been in operation at the Boyce Thompson Institute for Plant Research with the dual objectives of characterizing authentic vanilla extracts and detecting adulteration with foreign botanicals and flavoring materials. He said that the program has perfected a rapid method for the chromatographic analysis of vanilla extract, which will detect adulteration with other plant products, and show when an insufficient weight of beans has been used. The fluorescent pattern obtained on each type of plant extract is unique, therefore this method may find widespread use in the food, flavoring, and beverage industries for characterizing many products of botanical origin, and determining whether authentic ingredients have been used. To back up this rapid and revealing qualitative test, a series of quantitative analyses were developed for resins, amino acids, organic acids, and other components of vanilla that will yield valuable supporting data for test cases.

On Tuesday afternoon Dr. Bernard L. Oser, special consultant to the F.E.M.A., spoke. Dr. Oser referred to the food additive regulations, Section 121.5—safety factors to be considered, which in part provides, "a safety factor based on animal-experiment data of 100 to 1 will be applied; that is, a food additive will not be granted a tolerance that will exceed 1/100 of the maximum amount demonstrated to be without harm to experimental animals." The scientists, he continued, interposed objections to the 100 fold safety factor in evaluating and translating toxicological data in animals to use levels in man. In a recent discussion on this point with Dr. Lehman of the Food and Drug Administration, Dr. Lehman pointed out that this 100 fold factor is to be regarded simply as a bench mark, that there is nothing holy about it and that, in any given situation, a deviation from the more or less arbitrary 100 fold factor may be justified. Dr. Lehman, he said, pointed out that if the 100 fold factor were to be applied literally we wouldn't be able to say that some vitamins were safe, for example Vitamin A or Thiamin, which can produce adverse physiological effects at levels much less than 100 times their normal use levels.

Drug, Toiletries Sales Up

Drugs and toiletries accounted for $212,800,000 in sales in variety stores during 1958, an increase of $12,700,000 over the preceeding year, according to *Variety Store Merchandiser*.

The turn-up in toiletry sales came during the so-called recession months of 1957-58. Asked how toilet sales could improve in a recession period, one variety buyer explained that more women began working to supplement their husband's reduced incomes, and these women found it necessary to buy more cosmetics, lipsticks, nail polish and hair goods to look neat and attractive in their jobs.

Upgrading of merchandise continues to meet the inroads of supermarket competition in toiletries. "Low end merchandise in most cases," says one variety store executive, "must be eliminated." We are getting rid of cheap lipsticks as fast as we can, because nationally advertised brands have practically eliminated them from the type of merchandise our customers expect to find. Today, they come into our stores looking for the brands they saw on television last night, or read about in a magazine."

Another buyer states: "We are trading up as rapidly as we can into what might be considered department store lines. Items such as toothpastes have become what I call 'basket items'. Women think of them in the same way they do soap powders and detergents. When that happens, we may as well kiss the line goodbye. To make up for such losses, we have to make up lines where there is a greater degree of decision-making in the purchase, where style, quality, price, and fashion are bigger factors."

Drug and health aids are becoming a more important part of the variety market, particularly where variety stores make special efforts to attract this business. Variety and similar type stores now account for 7% of the more than $200 million colds remedy market; 10% of the $145 million laxative total; almost one-quarter of the external pain killers, a total market of $82 million; 50% of the liniment market; 76% of the almost half-billion baby needs market including baby powder, oils, nursing bottles, nipples, sterilizers, etc.

SCC sets December Meeting

The next annual technical meeting of the Society of Cosmetic Chemists will be held on December 2nd. Members are asked to plan to attend, to present research studies at the meeting, and to encourage their associates to attend and to present studies. Members are also asked to suggest topics and speakers to the program committee by contacting the program chairman, Lester D. Appersen, not later than August 1st.

Emery Industries Moves

The Chicago office of Emery Industries, Inc. has moved to new quarters at 6835 West Higgins Ave., Chicago 31, Illinois.

Because of its proximity to the new toll roads and expressways surrounding the city, the new location provides easier access to the entire Chicago area. Emery's present warehousing operation in Chicago will continue unchanged.

The office will serve as headquarters for Joseph E. Quinty and Paul N. Leech, sales representatives for Emery's organic chemical and fatty acid sales departments, respectively, in a five-state territory surrounding Chicago.

Products of the fatty acid department include Enersol stearic and oleic acids, Hyfac hydrogenated fatty acids, and glycerides, Emery distilled animal and vegetable fatty acids, Emtall tall oil acids, and Hyfac castor oil products.

Organic chemical sales department products include Plastolein plasticizers, Emolein lubricant esters, Emersoft and Twitchell textile chemicals, Emery and Metholine fatty acid esters, Empol dimer acid, Emerox azelaic acid, and Emfac pelargonic acid.

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Henley Speaks To Druggists

Henry H. Henley, vice president, McKesson & Robbins, Inc., characterized the retail druggist as a giant of man, not only in his sales potential but also in his popularity in his speech recently before the Colorado Pharmacal Association Convention. He cited an Elmo Roper survey which reported that the druggist ranks first among local businessmen for fair dealing in the estimate of 3000 people interviewed. Another survey, sponsored by the National Wholesale Druggists Association, showed that customers give a special loyalty to the drug store and that 80% of consumers habitually shop in the neighborhood drug store.

"Retail druggists are stronger today than at any other time in their history. Most certainly, there is no need for the druggist to be stampeded by predictions of doom."

In his address, Mr. Henley urged members of the drug industry to recognize and act upon the retail druggists' vitality and competitive strength in making their marketing and selling plans. He said, "Despite a lot of propaganda to the contrary, the traditional retail druggist remains a very powerful link in the drug industry's chain of distribution. That is a fact that none of us in the drug industry can afford to ignore—neither manufacturers, no wholesalers."

Mr. Henley urged druggists to capitalize on this stamp of approval and to increase their merchandising efforts in the battle against "non-drug" competition. "Hit them where they are the strongest and the weakest. Stand up and be counted, Mr. Druggist—you're a tougher competitor than most people realize," he said.

National Chlorophyll Purchased

Great American Industries, Inc., New York, recently acquired as a wholly-owned subsidiary, the National Chlorophyll and Chemical Company, with plants at Lamar, Colorado. The company is a producer of chlorophyll, xanthophyll, phytol and carotene, as well as powdered vegetable extracts. An expansion program into other related organics is planned for the near future.

PI Inaugurates Aerosol Committee

Packaging Institute took another major step forward in the service of industry with the organization of an Aerosol Committee late last month. Informal "soundings" which preceded the move revealed a high degree of interest in the proposal for the committee's formation on the part of food, drug, cosmetics, paint, and insecticide packagers.

Like the 25 other technical committees of the Packaging Institute, the basic function of the new Aerosol Committee will be to help the user of packaging materials and machinery—the producer of products which require packaging. This is accomplished through the technical committee system of concentrated study in specialized areas which has been developed in the Packaging Institute over the past 20 years.

Serving as chairman for launching of the Aerosol Committee is Fred T. Pickerell, senior buyer of the Schering Corp. He has announced that an organizational meeting, with election of permanent officers, will take place in September, probably in the new offices of the Packaging Institute at 342 Madison Ave., New York City. The first regular working meeting of the group will be held during Packaging Institute's National Packaging Forum, scheduled for Nov. 16-18, Statler-Hilton Hotel, New York City.

Mr. Pickerell is putting together a tentative program of activities for the Aerosols Committee, and prospective members are now being contacted. Those interested may obtain further information by getting in touch with Mr. Pickerell at the Schering Corp., 520 Broad St., Newark, N. J.

Much of the work leading to the committee's formation was done by L. H. Zahn, Ciba Pharmaceutical Products, Inc., vice president and director of com-





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mittee activities of the Packaging Institute; W. B. Tibbets, Union Carbide Plastics Co., and S. D. Smith, Dow Chemical Co., chairman and vice chairman respectively of the Institute's Materials Division, in which this new committee will operate.

The Chemical Specialties Manufacturers' Assn., trade association for the aerosols field, estimated conservatively some time ago that a 500-million-container market was imminent. Sales of a billion aerosol containers of all types for a growing number of products is likely in the near future.

A set of broad objectives has been set for the Aerosol Committee, to serve as a guide in its forthcoming studies of this relatively new type of container. Among these objectives are development of definitions and nomenclature of the component parts of the aerosol package; establishment of mutually-satisfactory standards for each of these parts; development of effective test procedures for evaluation of the component parts, and cooperation with other organizations and industries which are concerned with aerosol propellents and aerosol filling techniques.

It is expected that the committee's work on component parts will cover the container, the value (including the dip tube), the closure and the label. Its projected scope will include glass and metal containers, and possibly plastic containers, of various sizes for food and non-food products, plus the more important specialties.

John T. Connor Elected Chairman of Manufacturing Chemists

John T. Connor, president of Merck & Co., Inc., Rahway, N.J., was elected chairman of the board of directors of the Manufacturing Chemists' Association at its 87th Annual Meeting on June 11-13 in White Surphur Springs, West Virginia. He succeeds Harry B. McClure, vice president of Union Carbide Corporation, New York.

Dr. David H. Dawson, vice president, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., succeeds Mr. Connor as chairman of the executive committee.

Gen. John E. Hull, USA (Ret.), full-time president and a director, was re-elected.

Elected as vice presidents were Thomas S. Nichols, chairman of the board of Olin Mathieson Chemical Corporation; New York, and R. W. Thomas, vice-president of Phillips Petroleum Company, Bartlesville, Oklahoma. Maurice F. Crass, Jr., Washington, was re-elected as full-time secretary-treasurer.

Directors elected for a three-year term expiring May 31, 1962, are: Peter C. Allen, president, Canadian Industries Limited, Montreal; L. G. Bliss, president, Foote Mineral Company, Philadelphia, Bruce K. Brown, president, Petroleum Chemicals, Inc., New Orleans; Howard S. Bunn, president, National Distillers and Chemical Corporation, New York; A. E. Forster, president, Hercules Powder Company, Inc., Wilmington; John R. Hoover, president, B. F. Goodrich Chemical Company, Cleveland; Theodore Marvin, president, Michigan Chemical Corporation, St. Louis, Michigan; Carl F. Prutton, executive vice president, Food Machinery and Chemical Corporation, New York; and Robert B. Semple, president, Wyandotte Chemicals Corporation, Wyandotte, Michigan.

Safety Award Given

Spencer Chemical Company of Kansas City, Mo., and the J. T. Baker Chemical Company of Phillipsburg, N.J., received the Lammot du Pont safety awards made annually by the Manufacturing Chemists' Association.

Harry B. McClure, retiring board chairman of the MCA, presented the bronze plaques to C. Y. Thomas, senior vice president of Spencer Chemical Company, and to Dr. J. R. Stevens, president of the J. T. Baker Chemical Company.

MCA's bronze safety plaque, named the Lammot du Pont safety award after its sponsor and one-time president of the Association, is the most coveted of all chemical manufacturing safety awards since it is won in open competition with

(Continued on Page 72)



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Detergents

(Continued from page 44)

surfaces. This is illustrated in Figure 1. Surfactants are shown adsorbed on the surfaces of soil and fabric. The polar groups are ionized and their counter ions, such as sodium ions, have wandered away far enough so that the soil and fabric surfaces bear strong electrical charges. Thus, by increasing the negative zeta potential with a surfactant, increased repulsion between the surfaces of soil and fabric occurs.

This is not only an effective way of separating soil from fabric surfaces but of peptizing soil as well, as shown in Figure 2. Adsorption of the ionized surfactant breaks up colloidal aggregates, then disperses and suspends the finely divided particles. Each particle of soil tends to repel all other similarly charged particles, as well as repel the fabric surface.

The greater the ability of a surfactant to increase the negative zeta potential, the greater its detergency effectiveness. Thus, to obtain maximum cleaning effectiveness, the surfactant should not only have a large hydrocarbon chain to cause its strong adsorption on soil and fabric surfaces, but it should be anionic as well to take advantage of this electrical effect. Therefore, the third requirement of an idealized cotton detergent formulation is that it contain an *anionic* surfactant.

The ability to increase the negative zeta potential of surfaces is an important function of inorganic polyphosphate builders. In addition, these versatile materials sequester hard water cations efficiently, a property not possessed by surfactants. When adsorbed on soil and fabric surfaces hard water cations such as calcium, magnesium and iron tend to neutralize the negative zeta potential, thus reducing the electrical repelling forces between surfaces. As illustrated in Figure 3, these cations can be visualized as bridges responsible for a sturdy bond holding soil to fabric.

Polyphosphates are highly effective in de-ionizing or sequestering these polyvalent cations, thus breaking soil-cation-fabric bridges. Also, they help prevent soil redesposition caused by hard water cations. Although anionic surfactants can rupture soil-cation-fabric bonds by the mechanism of ion exchange, it is a much less efficient process than sequestration. Surface active mono-sulfates and mono-sulfonates are neither sequestrants nor are they as effective as soaps in precipitating hard water cations. It is difficult to imagine a surfactant structure having the high degree of sequestering effectiveness possessed by polyphosphates. Therefore, it seems likely that, to obtain maximum cotton detergency effectiveness, the ideal detergent formulation should contain both a surfactant and an efficient sequestrant. This is requirement number four.

In summary, a design guide is suggested for better cotton detergents. Analysis of the important roles of surfactants and builders and the physicochemical principles involved in the cleaning process form the basis of this design guide.

An idealized cotton detergent is visualized as follows:

1. The detergent formulation should contain both a surfactant and a highly efficient sequestrant for hard water cations.
2. The surfactant should have at least a moderate degree of surface activity as manifested by its wetting and emulsifying properties.
3. The hydrocarbon chain of the surfactant should be as large as possible without sacrificing a moderate degree of wetting and emulsifying activity, and other desirable surface active characteristics.

(Continued on page 73)

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(*Continued from Page 70*)

other chemical companies. The competition dates back to January 1, 1950, and the first presentation was made at the MCA's annual meeting in June 1952.

Winning companies are those which show the greatest percentage reduction in average disabling injury frequency rate for the past two year period compared with the rate for the immediately preceeding three years.

Mr. du Pont's motive in sponsoring this annual award was "to inspire and encourage MCA member companies to improve and effectuate their industrial safety programs to prevent personal injuries." Plaques are awarded to a company in each of two groups—one made up of companies working in excess of two million man-hours per year and the other of companies working less than that figure. The Spencer Chemical Company belongs to the first group, and the J. T. Baker Chemical Company belongs to the second.

Tracy and Eisenhower Speak

Two speeches before the Manufacturing Chemists' Association's annual meeting discussed expansion of trade and exchange with two rapidly growing areas of the world.

Dr. Milton S. Eisenhower, president of Johns Hopkins University, spoke on American economic relations with Latin America, and O. V. Tracy, vice-president and director of the Esso Standard Oil Company, spoke on "Doing Business with the Russians."

Dr. Eisenhower stressed that Latin America is an area in transition. "Due to modern communication," he said, "its millions of people, like their leaders, have come to realize that poverty, malnutrition, disease, premature death, illiteracy and other blights on human welfare, are neither universal nor inevitable. . . . It is a perfectly natural reaction for them to look to the United States for assistance. If neither the assistance nor the progress are as abundant or as rapid as they would like, the result is often disappointment, disillusionment and sometimes frustration."

Dr. Eisenhower went on to say that Latin America and the United States are indispensible to each other. He pointed out that, "the two-way cash trade today between Latin America and the United States is greater than that with Europe, and vaster and more important than all the trade we have with the Middle East, Southeast Asia and Oceania combined." He went on to say, "This level of trade is only a fraction of what it can be, in my judgment, under intelligent planning and the proper policies."

Points Out Misunderstanding

Dr. Eisenhower continued, "There is not today the degree of understanding among the peoples of these twenty-one republics that there should be to let us achieve the fruitful cooperation we desperately need." He blamed this lack more on the United States than on the Latin American countries, saying that Latin Americans know more about us through news coverage than we do about them. He pointed out that among Latin Americans, "There is a strong feeling that we of the United States do not consider Latin America to be as important to our welfare as are other areas of the world."

Reasons for Misunderstandings

There are two reasons for this feeling on the part of Latin Americans, according to Dr. Eisenhower. One is historic: since the Monroe Doctrine peoples to the south of the United States have continued to regard with suspicion all actions on our part, even though the thinking which motivated the Monroe Doctrine has long been obsolete. Latin Americans are bitter about our Marshall Plan, calling for vast expenditures in Europe; they do not realize that by building up European economy we increase the world market for Latin American goods.

"A second misunderstand in the economic area," Dr. Eisenhower went on to say," is the belief that our economic resources are essentially unlimited and that therefore their failure to get public and private capital in the volume they obviously need to make economic progress is due to sheer perversity on our part."

"The most hopeful thing I have observed in Latin America," concluded Dr. Eisenhower, "is the development of the common market concept. . . . I am convinced that no other area of the world is more important to us than Latin America," he affirmed," and I am convinced that by working together intelligently, the nations of this hemisphere can progress mightily, and jointly can maintain peace among the American republics. Thus, this hemisphere can set standards for all the world to emulate."

Russian Trade

O. V. Tracy, in his talk "Doing Business with the Russians" suggested that American businessmen should look carefully at all sides of the question before believing Premier Khrushchev's recent plea for increased foreign trade between the U. S. and Russia.

Tracing the historical background of this question, Tracy reminded his audience, "One of the most significant developments since the war—as far as our nation is concerned—has been the rapid expansion of the Sino-Soviet bloc. . . . They have never deviated from their expressed goal of world domination. . . . In the early 1950's, the Soviet Union was forced to look for new means to continue its expansion. . . . Cold war weapons have changed—thanks to the nuclear stalemate. Soviet leaders have realized that the conflict must be waged with the weapons of diplomacy, propaganda, technology, and economic policy."

Tracy went on to discuss this new weapon of "trade and aid," saying that it should in reality be called "economic warfare." Russian foreign trade, he said, is an instrument of state power which has three purposes: it overcomes a domestic shortage by purchases abroad, it obtains models for imitation from more advanced countries, and it tries to divide the free world and to economically weaken the enemies of Communism. Khrushchev himself, he reminded, has said, "We value trade least for economic and most for political purposes."

Russian Trade Different

In considering Russian and western trade, Tracy went on, we are considering two entirely different concepts of trade. "The foreign trade of the Soviet Union," he said, "is carried on only by the government, which owns and distributes all of the products that go into trade. Economic factors have little or no influence on trade policies. All exports and imports are controlled by the Soviet Ministry of Foreign Trade.

If we look carefully at the implications of this difference, Tracy continued, we are bound to see that trade between nations holding such different concepts is a risky business. Recalling the rejection of Israeli claims during the Israeli-Egyptian clash, Tracy said, "Businessmen can experience heavy financial

(*Continued on page 75*)



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Detergents

(*Continued from page 71*)

4. The surfactant should be anionic.

There is reason to believe today's detergents do not satisfy fully all these requirements. Thus, in the future better detergents are a real possibility. Improved materials can become available commercially only as we learn how to manufacture them on a large scale and at a competitive price. However, ours is an active and healthy industry. This is our greatest assurance that tomorrow's detergents will be better than those of today.

(Paper presented at the 1959 Annual Convention of the Association of American Soap and Glycerine Producers, Incorporated, on January 22nd, 1959 at the Waldorf-Astoria Hotel, New York City.)

Mutual Responsibilities of the Aromatic Manufacturers and the Flavor Industry

ALBERT FIORE*

Through its research and production facilities, the aromatic chemical industry during the last decade has made an increasing number of here-to-fore imported and/or high priced aromatic and flavor materials available at very reasonable prices. The industry has also made a number of new, useful aromatic and flavor chemicals available which have found expanding uses. At the same time the aromatic industry has been spending considerable time, money and effort to not only explore new products, but to study the older and well-established aromatics, in order to thoroughly understand their chemistry and to increase their usefulness. Dr. Theimer and Mr. Hettiger, in their part of the symposium, have given you an insight into the activities undertaken by the industry towards evaluating old standby products and the development of new flavomatics. The manufacturers also maintain extensive service laboratories in order to assist the users of their products with their proper application. All these efforts represent a significant investment which, in some measure, limits the funds available for other research activities.

With the advent of food additive legislation, it appears essential that the flavor industry devote time and money to standardize flavomatics. A decade ago such standardization would have been extremely more difficult but with the recent advances in analytical control and modern instrumentation (some of which were discussed by Dr. Theimer) there should be no foreseeable difficulty today. Standardization of flavomatics has been left to the aromatic chemical producers in the past. To undertake a thorough job of standardization of flavoring materials it appears that a concerted effort by the Society of Flavor Chemists would be required. Similar programs have been underway for many years by the Toilet Goods Association and the Essential Oil Association. The benefits of these programs by these affiliated associations are self evident. Programs of this type are much more readily accomplished by a trade association than by a single manufacturer or even a select group of manufacturers.

If these objectives can be realized by the flavor industry, then through concerted effort it should be possible to standardize and refine the various flavomatics that already are in use. This is a challenge to the Society of Flavor Chemists and most likely will be met with an adequate program.

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SPICE OILS an abstract...

Extracts from "SPICE OILS" paper, presented on Feb. 3, 1959 at the Society of Flavor Chemists in New York by Steffen Arctander

In a brief discussion on the Spice Oils, we can generally eliminate the pungent materials, particularly since Dr. Langenau has discussed the Oleoresins prepared from pungent spices. I have in the following concentrated upon Spices, which yield Essential Oils which are representative of the parent Spice in respect of flavor.

For the study of strength and power and the importance of "quality" in starting material and distillation technique, I have selected six different Spice Oils. Clove Oil being one of the most interesting and important of all Spice oils, naturally finds its place in such experiments. The other oils were: Cardamon, Ceylon Cinnamon Bark, Coriander fruit, East Indian Nutmeg and Allspice.

Twenty-one selected samples of the above six oils from various suppliers in the United States and Europe, all specialists in Spice Oil distillation, were studied in extreme dilutions in a 9% Sugar water at 50° F.

The experiments aimed at a determination of the relative flavor strength and flavor power of these oils. It was claimed, that the huge differences in flavor performance of these oils could be due to minute amounts of certain components in the oils, not even detectable by instrumental analysis.

Flavor strength refers to richness in body, to masking effect, while flavor power refers to the penetrating effect—or, to use a perfumery term "diffusive power".

Cardamon oil showed up to a 1½ time increase in strength as a difference between oils from various suppliers. However, the difference in power is practically nil: at extreme dilution, the ratio between the good and the poor oil is the same as it was in high concentration.

Cinnamon Bark Ceylon performed differently. The best oil was 2½ times as strong as the poor one, while the good oil had a power factor of 10, and the poor one only 3. Which means, that the good oil yields more than 3 times as much Cinnamon effect as the poor one. Extreme dilutions were the so-called "threshold concentration", where the flavor was just perceptible and could be identified as the spice in question.

The six oils showed various ratios of power and strength, and the "power factors" told us, that high-quality oils are definitely economical in use, since they pay back in powerful and pure spice flavor. Dilutions also show adulterations of Spice oils.

Suppliers' names and prices of oils were not mentioned, but the initial experiments show clearly the significance of high quality in Spice oils for flavor work, and that the known differences in cost of these oils is more than compensated for by the tremendous difference in flavor performance.

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(*Continued from Page 72*)
losses if a government refuses to honor its contracts. The Soviets have shown they will not hesitate to do this. Furthermore, there are no legal means to obtain compensation for losses. . . ."

In addition, the Russian's avowed political aim is eventual destruction of the capitalistic system and, according to Tracy, "it is the ultimate in inconsistency to support and finance the industrial expansion of a nation whose rulers' expressed goal is to destroy us."

In conclusion, Tracy said, "American industry must not surrender its advanced processes and equipment to the Soviet Union. We also must continue to urge our allies to reject deals designed to strengthen the Soviet industrial machine."

Pharmacists Protest Sale of Drugs in Supermarkets

The Pharmaceutical Society of the State of New York, failing to get state legislative support against the sale of proprietary drugs in non-drug outlets, is calling on consumers for help, according to an article in the June 5 issue of Printers Ink Magazine. With a $125,000 fund raised through its pharmacist members, the society has launched a newspaper campaign to caution the public about purchasing potent drugs.

The first ad, a half-page, dealt with such subjects as "Your family's health is our first responsibility," "Vitamins are medicines!," "You wouldn't buy your eyeglasses from a pushcart!" Future ads will be quarter pages consisting of similar subjects. Local pharmacists are purchasing newspaper space for the ads on a co-op basis.

The fight against supermarket distribution of patent medicines, of course, has been going on four years, with all the state pharmaceutical societies joining in from time to time. Last year, 17 states saw the introduction of bills designed to protect pharmacists.

The latest effort on the part of New York state pharmacists was their support of the Brydges-Schoeneck Bill, which would put a clear-cut mandate on the pharmaceutical law as it now stands-forbidding the sale of "poisonous, deleterious or habit-forming" drugs except by a registered pharmacist. These definitions provide the loopholes needed by non-drug outlets.

Both Groups Seek Definition

Both pharmacists and the Proprietary Association (representing manufacturers of patent medicines) have endeavored to get bills passed that would define these definitions, particularly "deleterious," in their respective favors.

The Brydges-Schoeneck Bill would not only define "deleterious" but would "require that the pharmacist selling the medicine acquaint the purchaser with the nature of the preparation, the dosage and the warning of caution contained on the label." While the bill passed the State Senate, it got bottled up in the State Assembly's Rules Committee. It will be re-introduced in January.

Meanwhile, the New Jersey State Pharmaceutical Society is employing a different means for the same end. For more than a year, the society monitored TV and radio commercials for false and misleading ad claims for pharmaceuticals. It has presented this evidence to the Congressional committee in support of the fact that patent medicines should not be sold without pharmacists' approval and caution.

Pharmaceutical manufacturers understandably have no sympathy for the druggists. They want to sell in as many outlets as possible. According to a spokesman for a leading analgesic maker: "Druggists weren't smart merchandisers so they lost most of their toiletries' sales to food stores. Now they're trying desperately to hold onto patent medicines. They claim a purchaser should be advised in buying patent medicines, yet they let their soda jerks sell Bromo-Selker."

Asked to comment on the issue, the American Medical Association said that "while it definitely takes a sand on misleading advertising, it steers away from patent medicines as they relate to distribution." The Pharmaceutical Society of New York, however, has confidence that the medical profession will eventually take a stand on the matter. When and if the New Jersey society's report on false and misleading advertising comes out, the AMA will be in a better position to comment.

Pennsalt Uses Educational TV

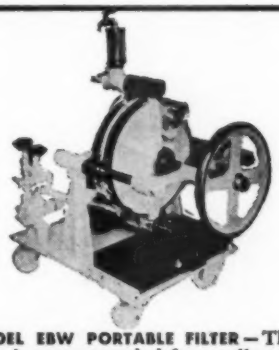
The story of the growth of aerosols, how they work, and how they benefit consumers was told recently to science students in more than 30 junior high schools in the Greater Philadelphia area through the medium of educational television. Television tutors for the television science lecture were Robert Weiner and Allen Reed, aerosol technical service men employed by Pennsalt Chemicals Corporation, manufacturer of a complete line of Isotron propellents for the pressurized packaging industry.

Weiner and Reed, members of the research and development staff at Pennsalt's central research laboratories, used charts, diagrams, aerosol containers, and a motion picture in their informative and interesting half-hour program on WHYY-TV, Philadelphia's educational television station, on June 4. Sponsored by the American Chemical Society, the program was one of a WHYY-TV series beamed weekly to young science students in their classrooms.

The Pennsalt technical service men traced the growth of the aerosol from the time the chlorofluorohydrocarbons were first used as refrigerants in the 1920's to their abundant present-day application as refrigerants and propellants following the discovery during the 1940's of the efficiency of loading insecticides into pressurized containers and the effectiveness of an aerosol spray. They cited the GI "bug bomb" of World War II fame as the first consumer application of the aerosol concept.



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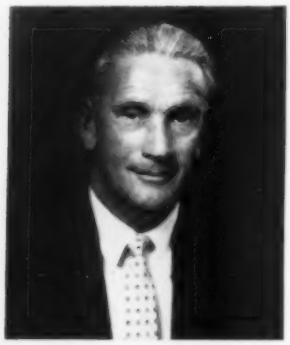
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PERSONALITIES

Victor F. Sommer was elected to the board of directors of Shulton, Inc. at the recent annual meeting of stockholders. He joined Shulton in 1942 and has held various executive positions in the company.



Victor F. Sommer

Irving Trabich has been named director of product and package design for Hazel Bishop, Inc. He will be directly responsible for the product design of all packages. For the past eleven years Mr. Trabich was senior art director of Raymond Spector, Inc.



Irving Trabich

Ernest E. Koken has been named Engineering Manager of Mojonnier Associates Division, Kartridg-Pak Machine Company, Franklin Park, Illinois, makers of aerosol packaging machinery.

Donald A. Beardsworth has been named midwestern manager of the Aerosol and Industrial Products Division of the Risdon Manufacturing Co. effective July 1. He will succeed **Andrew Peasco,** who is returning to Risdon's headquarters' office for a new assignment. Prior to joining Risdon late in 1958 Mr. Beardsworth was a sales engineer with Union Wire Die Corp.

Avard E. Fuller has been elected president of the Fuller Brush Company. He succeeds his brother A. Howard Fuller who died in an automobile crash last month. **Ralph W. Carter,** the company's Chicago area manager, has been elected director and vice-president and sales manager, and **Harold L. Hart** has been elected vice-president.



Avard E. Fuller

Mr. J. Andreeff, director of the essential oil house of V. Fringhian S.A., Paris, has returned to France after a three week stay in the United States.

Walter J. Fitzpatrick, Jr. has recently been named assistant to product sales manager, Union Carbide Chemicals Company, division of Union Carbide Corp. He will assist in the marketing of plasticizers, monomers, and higher alcohols.

Fred N. Dundas was elected president of the Glass Container Manufacturers Institute, Inc. at a meeting of GCMI's board of trustees on May 20. Mr. Dundas is executive vice-president of the Dominion Glass Company Limited. **J. S. Heuisler** of the Maryland Glass Corp. was elected first vice-president and **C. G. Bensinger** of Owens-Illinois, second vice-president.

Everett E. Lewis has been named metropolitan sales manager of Metro Glass Co. Mr. Lewis comes to Metro from Owens-Illinois Glass Co. where he served in various sales capacities in their New York branch. He will be in charge of sales in the area covering all of metropolitan New York.

Ernest H. Kastning has been named vice-president and technical director and **G. Wesley Joithe** has been named vice-president and treasurer of the Reheis Co., Inc. Both men will continue as members of the board of directors. Mr. Kastning,



Ernest H. Kastning

who has been with Reheis since 1958, was formerly with Warner-Lambert and Chas. Pfizer & Co. Mr. Joithe, who has been treasurer of Reheis since 1957, was formerly at Warner-Chilcott Laboratories and the Maltine Company.



G. Wesley Joithe

Erna Engle, now represents the French firm of Droit et Pharmacie, in New York. Her activities will include introducing in the U.S., organ extract products.

Marion E. Thorton has been appointed eastern area sales promotion manager of chain food stores, and **Charles T. Hobgood** is new western area sales promotion manager of chain food stores of the Colgate-Palmolive Company's Toilet Articles Division.



G. A. O'Reilly

G. A. O'Reilly has been appointed vice-president—sales, and **W. R. Keogh** has been appointed vice-president—operations at Bourjois, Inc. Mr. Koegh was previously executive assistant to the president and Mr. O'Reilly was sales manager of the company.



Everett J. Weaver

Everett J. Weaver has been named sales representative of the aromatic and odor control division of Rhodia, Inc. for the state of Texas. Prior to his appointment, Mr. Weaver was analytical chemist with Olin-Mathieson and later, chief chemist for the Butler Chemical Company.



Milton Harris

Milton Harris was elected president-elect of the American Institute of Chemists at their annual meeting held recently in Atlantic City. Dr. Harris is vice-president for research of the Gillette Company and president of Harris Research Laboratories, Inc.



W. R. Keogh

C. Brooks Ricca has been named sales manager for isotron propellents by Pennsalt Chemicals Corp. Formerly district sales manager of Pennsalt's metal processing chemicals, Ricca will direct all sales activities for Pennsalt's full line of isotron propellents throughout the U.S.

Dr. Charles L. Goldman has joined the staff of Food and Drug Research Laboratories, Inc. He was formerly asistant professor of bacteriology at the University of Massachusetts. At FDRL he will be in charge of microbiological research projects in his specialties, which include isotope techniques, chromatography, immunization studies, and the mode of action of drugs.

Henry H. Henley, Jr., vice president in charge of drug merchandising, McKesson & Robbins, Inc., has been elected a director of the company. Before his appointment as vice-president, drug merchandising, in 1956, Mr. Henley served as district vice-president in charge of McKesson's operations in the south. He joined the company in 1939. Mr. Henley is also a first vice-president of the National Wholesale Druggists Association.



Martin C. Sampson

Martin C. Sampson, M. D. has been named executive vice-president of the Pharmaceutical Advertising Associates, Inc. Dr. Sampson will direct the medical activities of the agency and supervise all copy. **Douglas E. Gosnell** has been appointed vice-president and accounts supervisor. He joined the company in 1957 as an account executive.



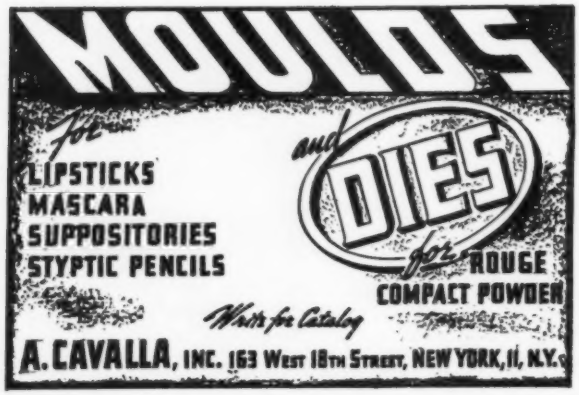
Douglas E. Gosnell

Donald V. Brown has been appointed manager-sales department for the Silicone Products Department of the General Electric Co. In his new position Mr. Brown will direct product planning, sales planning and market research for the department's silicone resin, fluid and emulsion product line. Mr. Brown was previously a specialist in marketing research for the department. He joined General Electric in 1947 as a chemist in resin development and subsequently served as manager of resin development, manager of process engineering and as a specialist in technical service.

Ruth Kitchen, Editor of the Dodge & Olcott News and former advertising manager of the Company, and her husband became last month the proud parents of an adopted girl, ten weeks old, whom they have named Deborah Ellen.

Edward F. Deane, Jr. has been appointed representative handling the Christian Dior line in Illinois, Iowa, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Wisconsin. Mr. Deane was formerly associated with Tussy Cosmetics. He assumed his new responsibilities with Christian Dior on June 1.

Dr. Leonard A. Scheele and **George P. Maginness** were both appointed vice-presidents of Warner-Lambert Company last month. Dr. Scheele has been president of Warner-Chilcott Laboratories Division of Warner Lambert since 1956 and a member of the board of directors. Mr. Maginness has been director of personnel and public relations since 1957. Also appointed was **Frank Markoe, Jr.** as secretary of the Company, succeeding **Robert B. Clark** who continues as senior vice-president of Warner-Chilcott Laboratories. Mr. Markoe is also corporate counsel of Warner-Lambert and a member of the board.



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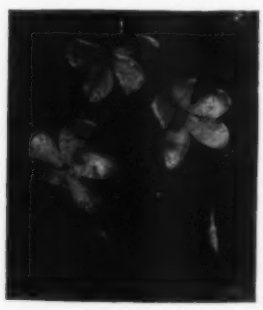
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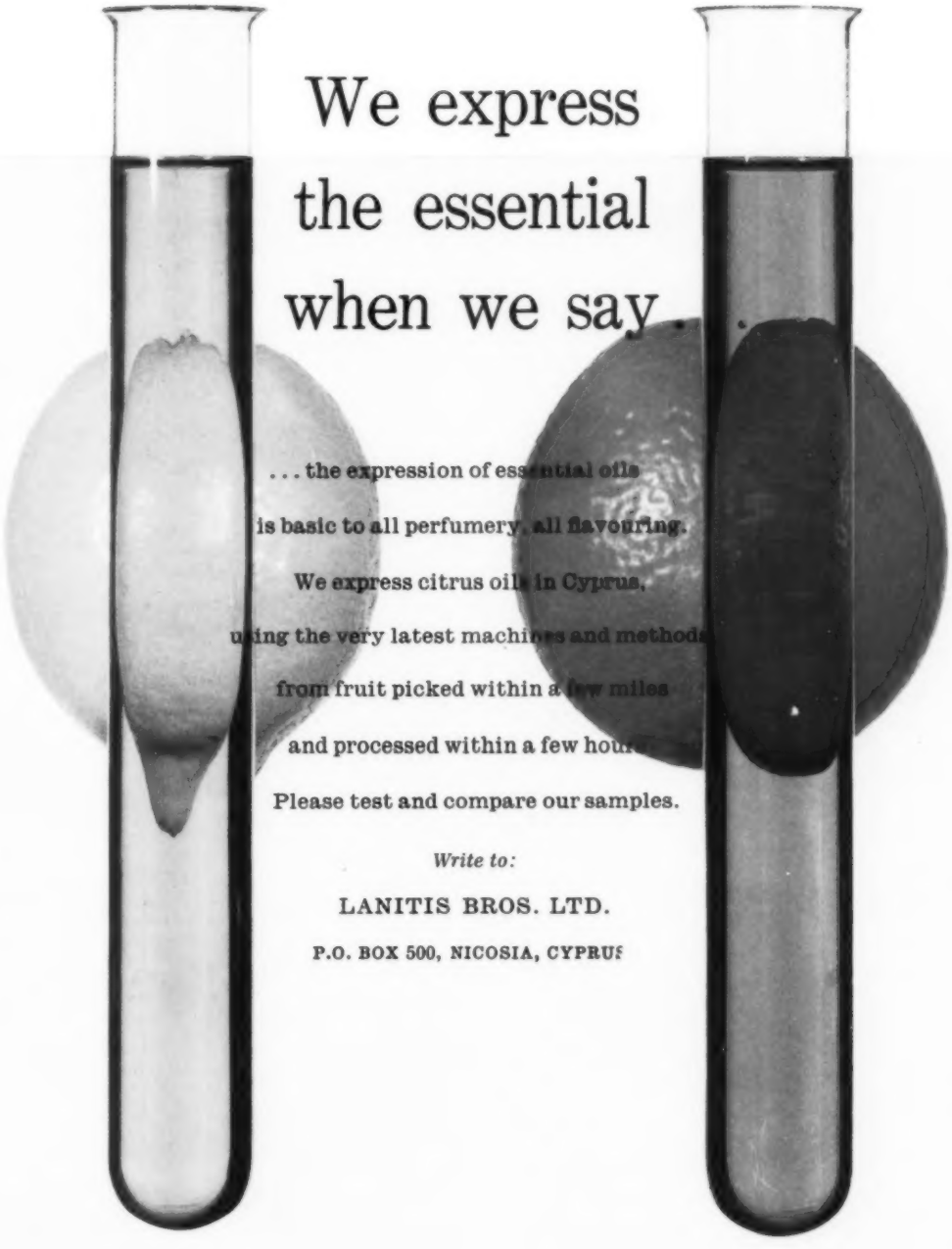
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